HIGH END MUNICH SHOW NEWS & HIGHLIGHTS

# australian hi-fi

## DIGITAL MASTERCLASS

Topping's does-it-all DAC is a desktop whizz

Reviewed

## STELLAR STEREO

Halcro's Eclipse amplifier outshines the competition

Reviewed

## FIGARO, FIGARO, FIGARO!

Opera-inspired Audio Solutions speakers deserve a standing ovation

MUSIC REVIEWS

Brian Eno career compilation, 'Best Of' the Boss + 5 must-watch music docos

Reviewed

## POWERHOUSE

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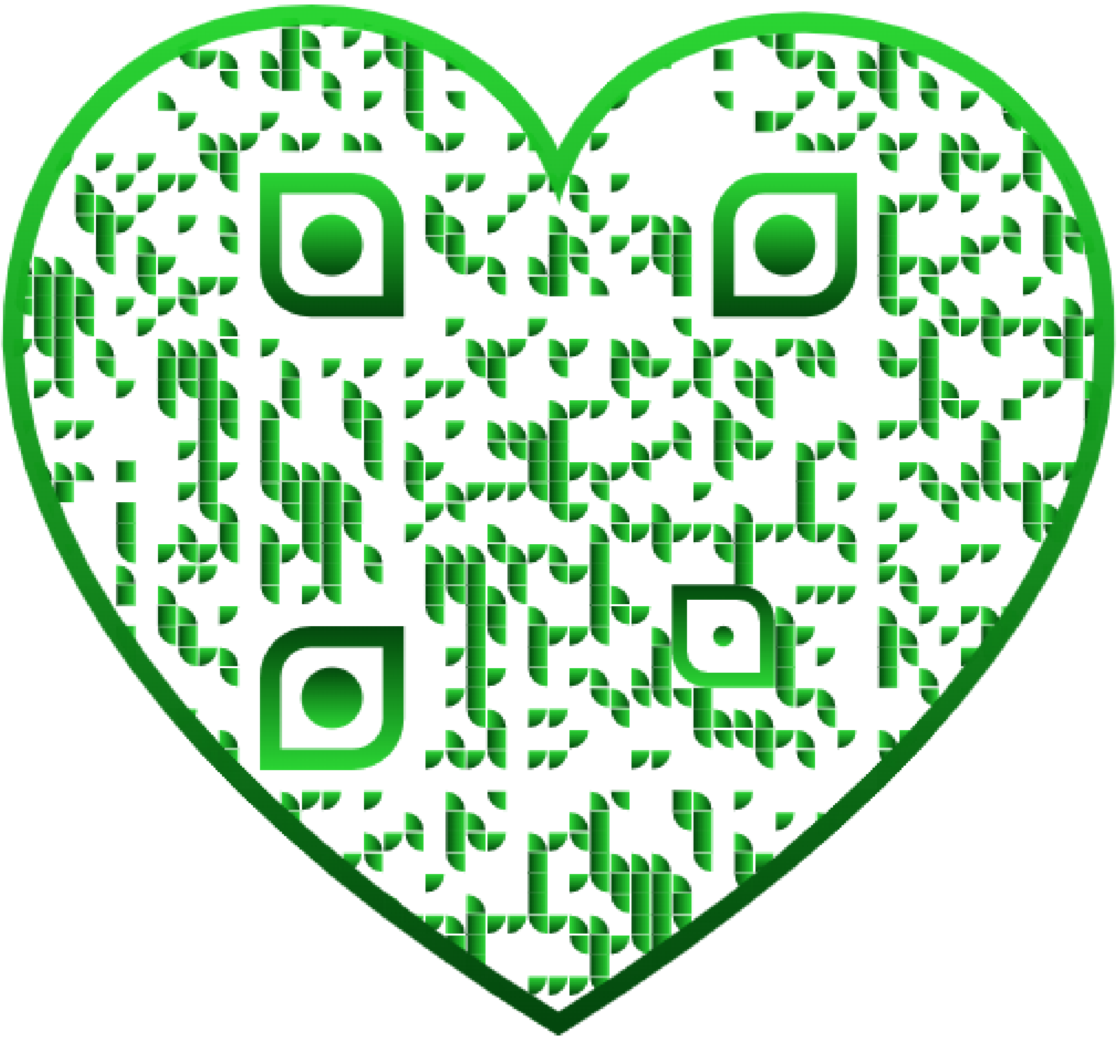

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# Editor's lead in

There are very few absolutes in hi-fi today, and what certainly isn't one of them (and never will be) is what defines the 'right' hi-fi sound.

Ask a room of music and hi-fi enthusiasts for their thoughts on the matter and things would all too soon erupt into the kind of pandemonium that would derange a digital-cable convention. (Just probably not as quickly.)

The die-hard rockers might throw out words such as "powerful", "atmospheric" and "bassy"; those who instinctively request Norah Jones at hi-fi shows may advocate the one that delivers the lushest vocals (midrange); the greatest lovers of life — the *bon vivants* — could say anything that makes music fun to listen to. Those deliberating quietly in the corner, including myself, would champion the most transparent-sounding system — the one that communicates the music as close to the recording as possible, stamping little of itself on it. We would all be right, and all be wrong… depending on the ears of the beholder.

Now, is there really a 'right' hi-fi sound for certain *genres*? Perhaps, so what music you like could reasonably sway your buying decisions. If you were asked to conjure a system through which to enjoy Muse's *Live at Rome Olympic Stadium* album to the fullest, you may very reasonably pick a powerful-sounding system with momentous scale and mighty low-end. It's probably more likely to be headed by Q Acoustics' 5040 floorstanders than the PMC prodigy 1 standmounts, which don't have the Q Acoustics' scale or bass power to rip through the album's cacophony of bass and drums as well and communicate the expanse of the live recording as effectively. Conversely, suppose you are the biggest contributor to Tidal's monthly streams of Sergei Rachmaninoff. In that case, you might well snap up those PMCs quicker than you could say "piano concerto" for their greater dynamic expression and precise (to the point of analytical) nature.

"It's all a matter of tools for the job," said a former colleague, before offering the parallel that just as a classical guitar is wonderful in a hushed concert hall it won't do much when it comes to filling a stadium. Indeed, the kind of system that sounds lush, mellow and well-detailed with orchestral works probably won't also be the ideal sort to vibrate the walls with Charlie XCX's latest foot stomper.

So if you exclusively, or even mostly, consume a sonic diet of one music genre, whether that is classical or blues, dub-step or hip-hop, a certain sound of system may well work best for you — and that's fine. Many hi-fi manufacturers imprint a 'sound' on music, whether that's to emphasise bass, honey vocals or mellow it all out, because it sells. A lot of people worship single-ended tube amps for tending to sound congenially warm (due to their even/second-order harmonic distortion); others don't. Psychoacoustics is a funny thing, isn't it?

Don't let anyone put you off acquiring a sound that excels in one or two particular areas just because it might not be the most unadulterated, 'purest' sound. (Though do be aware that when a component favours or emphasises one element, it will likely have a weakness in another, so you'll want to accept that as wholly as you do its strength(s).)

Such varying disposition is primarily why I wouldn't necessarily disregard a product that gets a less-than-perfect review score. The reviewer might've settled on it due to a sonic trait they didn't think was faithful or universally appealing; but it might suit your tastes.

So what if your taste is varied, your algorithm-led Tidal playlist suggesting GoGo Penguin next to Fontaines D.C.? Is the best system the safe, neutral, balanced all-rounder? I personally think so. The more transparent it is, the more of the recording and artist's intention you are hearing; and isn't that the most enjoyable and, therefore, The Best?

One can always take advantage of DAC filters, tone controls or custom EQ tools when they want a bit more of something for a particular track or album — even if such features have varying degrees of effectiveness and tend to muck something else up!

Ultimately, the 'right' sound is the one you like! **rebecca.roberts@futurenet.com**

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**esoterica**

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## OUR FRONT COVER

Halcro's legendary mono amp gets the two-channel treatment. Want more channels? Adcom delivers. And Lithuania serves up a loudspeaker surprise.

# Promising debuts

A silk-dome tweeter in a large surround dome with a dual balanced compression chamber, high-strength neodymium motor system and a non-reflective cast aluminium chamber. A 7.5-inch high-strength woofer with an Egyptian Papyrus diaphragm backed by a copper/neodymium high-force factor motor, meticulously crafted from copper and a high-purity neodymium alloy. Cabinets of double-wall construction with a solid oak outer layer, made by skilled local cabinet makers from materials sourced both locally and imported from Europe and North America. And crossover electronics made in-house from 100% film capacitors and hand-wound inductors.

Those are the ingredients for the launch speaker model from a new Sydney-based marque, Atlas & Hurd. The 42cm-tall Tempest are two-way standmount speakers said to "honour the golden era of hi-fi — 1960s through the 1970s — with warmth and character, while adopting the greatly improved technology of today".

The new company brings together the talents of engineer Atlas Gouverneur and furniture designer Tony Hurd. Both have a strong track record in associated endeavours.

A mechanical and electroacoustic engineer, Gouverneur has been designing speakers for over a decade, including founding The Speaker Project, which allowed anyone to come and build their own speakers. It was "about democratizing the joy of this hobby," says Gouverneur, who began designing his own speakers after a hi-fi revelation in front of a pair of unaffordable Sonus fabers.

He now joins forces with Hurd, who has been in the high-end furniture business for 25 years with his company Altone Design, while also being an avid collector of vintage and modern hi-fi.

Together they set out to build the speakers they both ultimately wanted to listen to.

"We wanted to produce the everyday speaker, a speaker that is engaging while easy to listen to," says Hurd. "The Tempest isn't just a speaker; it's a new audio experience. Crafted with a large 7.5-inch woofer and a 1.25-inch textile dome tweeter, it can cover a wide frequency range with dynamics and speed that match big floorstanding speakers."

Future plans for the company are made clear on the website, which already features further models, including the 'coming soon' Stoic floorstanders at $8,490, smaller Tinka standmounts at $2,590, and a remarkable 'Ace Audio' radiogram at $6,690.

Meanwhile, the Tempest cost $5,390 a pair (a special launch price of $4,690 is still live at the time of writing) and come with a seven-year warranty. The speakers can ship Australia-wide and online purchases offer a 14-day in-home trial period policy.

For more information, visit Atlas & Hurd at www.atlasandhurd.com.au

# ATC's anniversary actives

Venerable British hi-fi brand ATC has announced a special limited run of two products in celebration of its 50th anniversary this year — the SCM20ASL Limited Edition active standmounts and C4 Sub Mk2 Limited Edition subwoofer.

Only 150 pairs of the speakers and 20 units of the sub are available, so prospective buyers with cash to splash may want to get in on this exclusive release sharpish.

The SCM20ASL LE are two-way actives featuring the company's proprietary 15cm 'Super Linear' mid/bass driver alongside a 25mm 'S-Spec' dual-suspension tweeter. Their front baffle is adorned with "royal blue full-grain Napa leather" while the cabinet is finished in a high-gloss lacquer in dark blue, ATC's trademark colour.

The bass driver is housed in a 20-litre sealed cabinet and fed 200 watts of continuous power by an onboard Class A/B MOSFET power amplifier. A second delivers 50 watts of continuous power to the tweeter. ATC's active crossover and all-pass filter have been designed to optimise phase response and offer improved imaging and tonal balance.

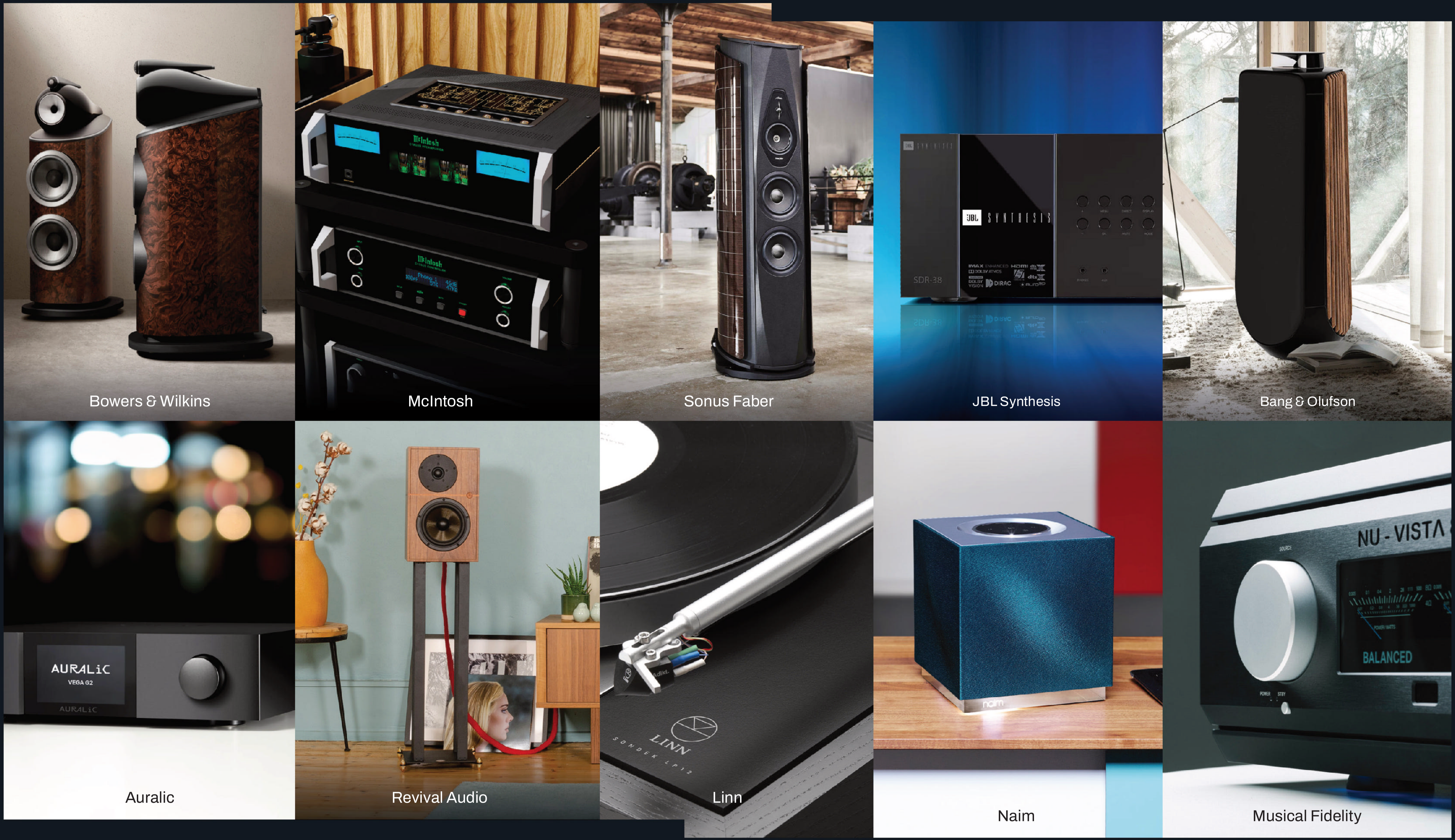
On the speakers' rear are balanced XLR inputs alongside controls for input sensitivity (which should allow flexibility over which source/preamp you pair with them) and low-frequency shelf cut/boost (to adjust the bass response to suit your room or taste).

ATC chose an active design for several reasons. Primarily, it claims that a multi-way speaker system will only realise its true potential when an active crossover design is implemented. Other benefits the company lists include a greater dynamic range, more efficient use of amplifier power, improved frequency response and better driver control.

The C4 Sub Mk2 active subwoofer, meanwhile, features a 30cm driver and sensibly matches the SCM20ASL LE aesthetic, with a high-gloss dark blue cabinet and leather front baffle, plus silver-anodised amplifier hardware for a premium appearance.

Both limited-edition products are available now, with the SCM20ASL LE and C4 Sub Mk2 LE costing $22,490 (per pair) and $8,750 respectively.

For more information, contact Pure Music Group on 0409504805 or visit www.puremusicgroup.com





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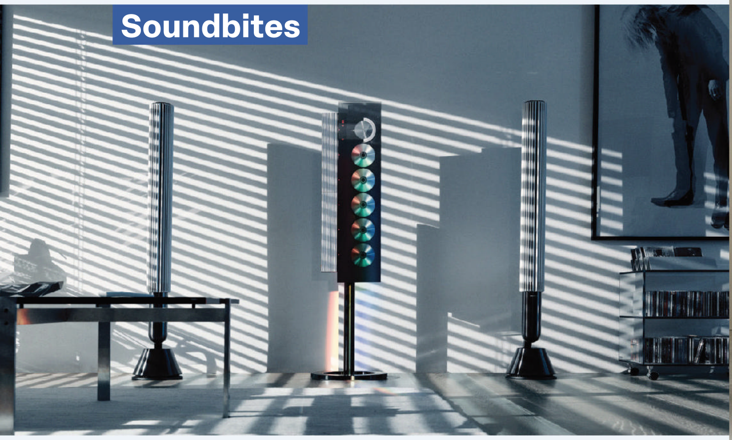

# ‘90s CD-changer restored

While many of us probably left our appetite for renovation projects back in 2020, Bang & Olufsen has seemingly run with the newfound hobby.

Having that year recreated 95 of its Beogram 4000c turntables from the '70s, it has now revived another classic from the past for limited-edition sale: the Beosound 9000 CD player. Only this time it isn't solely a CD player (probably sensible) but a fully fledged music system.

While the fully restored and reimagined six-disc CD changer from the '90s lies at its nostalgic heart, the Beosystem 9000c also comprises the company's 2021-released Beolab 28 active wireless speakers and a Beoremote One control.

The second project in the brand's recreated classics series came from a desire to “demonstrate that a second-life product can be just as attractive as a new product and that a high-quality item such as the Beosound 9000 doesn't need to have an end date,” says the company's Mads Kogsgaard Hansen.

In a nutshell, the super-slim and ultra-smart Beolab 28 speakers have amplification built-in, offer wireless streaming via AirPlay 2, Chromecast and Bluetooth 5.0, and, in true B&O fashion, sport unique mechanical wizardry: when the system is switched on, the speakers slide aside into either ‘narrow’ (focused stereo image) or ‘wide’ (wider dispersion) mode.

As for the resurrected Beosound 9000 CD player itself, B&O managed to source 200 of them to bring back to its factory in Struer, Denmark — the very place where they were first created in 1996. Closing another satisfying circle, some of the technicians who worked on the original have played a hand in inspecting, repairing, cleaning and tuning the players for this project, too.

Presumably so that the CD player and speaker pairing would get the nod of appreciation from even the most meticulous interior designer, the company inverted the deep black and natural aluminium finishes of the original colourway of Beosound 9000 to match the Beolab 28's aluminium lamellas and black aluminium base. Every aluminium element of the CD player is a re-machined and re-anodised original part — hairline brushed, etched and pearl-blasted.

According to Bang & Olufsen, the industrial designer of the original Beosound 9000, David Lewis, advocated designs that allowed owners to see — and be ‘in touch with’ — their music, hence the visibility of all six CDs through a glass lid. The idea apparently came to him while walking past a record store in London, where six CDs were laid out in a row in the window. To complement that visual flare, when the CD-changer mechanism moves from the first CD to the sixth, it momentarily holds it to allow owners to read the text on the disc, before registering the information and playing it back.

The Beosystem 9000c is probably something most of us here in Australia will admire as opposed to purchase, though, as only 200 are available and each costs $55,000 USD.

For more information, visit www.bang-olufsen.com/en/us/speakers/beosystem-9000c

# Inspired by the past

The original Trapeze holds a special place in Audiovector's history. That speaker model was the company's first commercially successful product and helped to form the foundations of the brand it is today, not only in financial terms but also in technical aspects, such as the use of simple crossovers and the importance it places on linear phase response.

That was 45 years ago. This new version is officially called the Trapeze Reimagined, or Trapeze Ri for short. Audiovector is keen to point out that they are not retro designs but indeed cutting-edge, modern loudspeakers that have simply been inspired by the past.

The Trapeze Ri are squat three-way floorstanders, each standing 87.5cm tall and weighing a relatively hefty 50kg per pair. Their cabinet is made of specially chosen HDF (high-density fibreboard) and features a sloped, angled front baffle. This shape reduces the build-up of internal standing waves and improves the time alignment between the drive units. The result, Audiovector claims, should be a cleaner, more focused presentation.

The new Trapeze are available in four standard finishes: Black Ash, Nordic Oak, Italian Walnut and White Silk. You can also have them painted in a wide range of custom colours if they absolutely must match your decor.

All of the drive units are new, though they remain consistent with the principles the company has promoted over the years. The tweeter is an AMT (Air Motion Transformer), which works with a folded diaphragm that moves accordion-style to make sound. This approach tends to result in a lighter diaphragm and lower distortion than conventional dome alternatives. Good dispersion characteristics are claimed as well. As in previous Audiovector designs, the tweeter works in an open arrangement where its rearward output escapes through a port to give the sonic presentation a more spacious feel.

Below the tweeter sits a 13cm impregnated paper-cone midrange, which handles the sound between 500Hz and 3kHz. It has a corrugated surround for greater sonic agility and a vented, neodymium motor system for improved dynamics. Audiovector says it took great care with the chassis design to optimise rigidity and shape.

Things get even more sophisticated at low frequencies thanks to a forward-facing 30cm paper cone woofer (with a corrugated surround) working in tandem with an internal-mounted 20cm ported driver. This compound configuration is tricky to optimise, but Audiovector has a great deal of experience in developing such systems. If done well, such a bass arrangement delivers more low-end weight, extension and control than simpler conventional alternatives such as reflex porting, passive radiators and sealed boxes.

It is possible to improve the Trapeze Ri's sound by taking advantage of its optional ‘Freedom Grounding’ feature, though you will need to buy the dedicated cable, which isn't cheap at $1,150 for a five-metre set. You can also finetune the speakers' sound by adjusting their ‘damping factor’ switch. There are three settings and the choice depends on the design of the partnering amplifier and, to a large extent, your tastes.

Audiovector aims to make its speakers easy to drive, and the Trapeze Ri are no different. They have a claimed sensitivity of 88dB/W/m and a nominal impedance of eight ohms. That impedance dips to a minimum of 6.5 ohms at 20kHz, which shouldn't be an issue for good quality, price-comparable amps.

And the price for all this Danish engineering goodness? Hefty. The Audiovector Trapeze Reimagined speakers cost $28,600 per pair.

For more information, contact Class A Audio on (03) 8555 0735 or visit www.classaaudio.com.au

## Unique 'IsoActive'

Likely news to those who didn't spy the latest loudspeaker system out of Brisbane at the Australian Hi-Fi Show in April, Stereotech has now designed, manufactured and released another Dellichord model, the FR2035. The distinct-looking active speakers see an FR35 bookshelf monitor atop (and powered by) an FR20 isobaric active bass module. You can see why the manufacturer refers to them as an 'IsoActive' system, then.

The FR35 standmounts are also being released as a separate passive model, with owners having the flexibility to upgrade to the full FR2035 system in the future. Both of these latest launches build on the company's FR6 medium-sized standmounts, which also fly the flag for isobaric technology.

The larger FR2035 has been designed to offer big sound from relatively compact dimensions (95cm tall and 24cm wide, including spikes) and offers, in the words of Dellichord, "highly organic sound quality which delivers real bass extension with an exhilarating top end".

The FR20 bass module sports an isobaric configuration, which, for the uninitiated, means that one driver is hidden inside the enclosure in a compound arrangement while the other features on the baffle. Here, one 26.5cm bass driver is placed externally in the visible 'Octobaffle' (yes, it has eight sides) while a second sits directly behind it, with the motor power doubling for these light cones. This design typically allows manufacturers to produce decent low-end extension from a smaller cabinet.

Powering the two bass drivers in the FR20 as well as the drivers in the upper FR35 module are 500-watt amplifiers. Dellichord insists that crossover and time alignment digital processing duties were handled with care to produce "a cohesive transition between the two speakers" so that they sound like one.

That upper module takes inspiration from the famed LS3/5a, of which designer Andrew Hutchison is a long-time fan. Hutchison says that his goal was "to improve the performance of the LS3/5a design but keep the magic that makes it such an entertainer and a wonderful musical performer".

To that end, he used new technology and the latest raw materials that were not available all that time ago. He experimented with vibration reduction concepts in the cabinet, such as an acoustically isolated front and rear baffle, too. He also collaborated with Brad Serhan of both Orpheus and Serhan and Swift fame, particularly with crossover development and in choosing the drivers for synergy.

The result is an FR35 design that keeps a very similar front panel and drive unit diaphragm sizes, but further benefits from improved driver materials and quality.

The FR2035 IsoActive system costs $13,999 while the FR35 bookshelves cost $3,999.

For more information, contact Stereotech/ Dellichord on 0418772434 or visit www.stereotech.com.au

## Successor to two

Cambridge Audio has launched a sequel to its critically acclaimed CXA81 stereo amplifier. The new, sensibly named CXA81 Mk II isn't exactly an entire redesign or reimagining, keeping to the exact same dimensions and minimal aesthetic as its predecessor, just as the company's recently launched CXN100 music streamer stuck to those of its CXN (V2) predecessor.

Indeed it is with the internal circuitry that Cambridge Audio has focused the core of the CXA81 Mk II's updates. For one, there is a new DAC chip (an ESS ES9018K2M SABRE32) that handles PCM up to 32-bit/384kHz and DSD256 audio and aims to deliver "outstanding sonic resolution" from digital sources. New premium components have been chosen for the amplification circuitry, too, and the sound has been "retuned and greatly refined" by the brand's London-based engineers.

"Extensive comparative listening sessions were done with component swapping, with the aim to improve depth and sensitivity," says Cambridge Audio. "The result was ultimately the use of ten new op-amps. We added that required depth, better stereo imaging and engagement by putting higher-quality components into the signal path. The improvement to the DAC also provided better channel separation."

Elsewhere, connectivity remains generous, with inputs spanning four line-level RCAs, one pair of balanced XLRs, two opticals, and a single coaxial and asynchronous USB Type B, the latter of which can handle the max file resolutions natively. Built-in Bluetooth returns with aptX HD codec support, too. And in addition to preamp and subwoofer outputs is a front-panel 3.5mm headphone socket. Four pairs of speaker terminals allow owners to run two pairs of loudspeakers simultaneously.

As before, the CXA81 is a Class A/B design, delivering 80 watts of power per channel (into eight ohms).

Some may understandably find the lack of visually substantial or external updates disappointing, but the long-awaited upgrade should shine through in the CXA81 MkII's performance.

Interestingly, the CXA81 MkII doesn't replace only the CXA81 but also the step-down CXA61, meaning there is now only one stereo amplifier in the company's CX range, with no mid-price amp sitting between this new $1,999 model and the $799 AXA35. Curious.

For more information, contact BusiSoft AV on (03) 9810 2900 or visit www.busisoft.com.au

Soundbites

## More refined lyrics

Meze Audio, the Romanian brand behind such stylish headphones as the affordable 99 Classics and high-end Empyrean II, has introduced the second-generation iteration of its Liric headphones.

The Liric 2nd Generation (or Liric 2 for ease) feature planar magnetic technology, with an isodynamic hybrid array that, combined with the headphones' closed-back construction, supposedly “helps preserve the original clarity and emotion of your music through enhanced sound and minimised external noise”.

The Liric 2 also add a new “Quarter Wavelength Resonator Mask”, which is essentially a crafted metal plate that covers select openings in the driver frame in pursuit of a more involved listening experience.

Made partly in response to customer feedback regarding the original Liric model, the latest over-ears discard their predecessor's leather-clad earcup design in favour of ones dressed in a wood grain, striped ebony finish.

It is often a bugbear for headphones users — especially those who own premium-priced pairs — whenever the supplied earpads wear out and cannot be replaced. Thankfully, the Liric 2 feature detachable magnetic earpads that can be repaired or otherwise swapped out entirely. Furthermore, they come with two hand-braided copper cables: a 4.4mm option for portable players and headphones amplifiers, and a three-metre lead for “home listening”, i.e. for sitting back in a chair that isn't within touching distance of your electronics.

Meze Audio's founder and lead designer, Antonio Meze, says: “Developing great headphones means listening to a lot of music, but also listening to our community carefully... based on feedback from our customers, we've taken its capabilities to new heights with the new Liric 2nd Generation”.

The Meze Audio Liric 2nd Generation are available now for $3,550 — happily, the same price the original Liric launched at.

**For more information, contact Radiance Audio Visual at (02) 9659 1117 or visit www.radianceav.com.au**

## As ‘bookshelf’ as they come

Mission's all-new compact 750 standmounts continue the legacy of its iconic 700 series that traces its lineage back to the '70s. The retro-inspired speakers hark back to the company's heritage while forging their own path with a brand-new design.

While the British brand's larger 770 and 700 standmount speakers are modern reinventions of classic speakers, the 750 is indeed entirely new. They are primarily notable for their inverted driver arrangement, wherein the treble unit sits below the mid/bass driver. Mission claims this configuration — also found in other Mission models, such as the LX-2 and QX-2 MkII — aids timing and stereo imaging by placing the mid/bass driver closer to the listener's ear level and equalising the path lengths of the drivers' acoustic centres.

That mid/bass cone is 13.5cm and constructed from polypropylene, the use of which Mission pioneered in commercial loudspeakers. Minerals have been added to the cone to make it stiffer than regular polypropylene units, aiming to provide a faster, tighter bass response. Mission says it has tuned the rear-firing reflex port to a very low frequency, too, to avoid the ‘one note bass’ effect some bass-reflex systems are guilty of.

Meanwhile, the tweeter incorporates a lightweight 28mm microfibre dome supported by a damped rear chamber. Mission promises a smooth and detailed high-frequency performance from this unit.

The drivers and crossover are housed within a real-wood veneered cabinet, with a twin-wall sandwich of MDF and particle board connected by a layer of damping adhesive that aims to reduce panel resonance and noise interference. Internal bracing strengthens the front baffle for optimum performance from the mid/bass driver, too.

With positively ‘bookshelf’ dimensions, (35cm high, 21cm wide and 27cm deep), the cabinets sport the recognisable white baffle and signature Mission logo that have adorned many Mission speakers before them.

According to Peter Comeau, Mission's director of acoustic design, “the techniques and technologies harnessed to create the 750 are cutting-edge, but as always with Mission this technology is used purely to capture the emotional power of music — in line with the company's motto: ‘music leads, technology follows’.”

The Mission 750 speakers are available now in either walnut or black wood veneer finishes, costing $2,199 per pair. There are also the dedicated — and, if you ask me, particularly well-named — Stance speaker stands, available at $629 per pair.

**For more information, contact AV Revolution on (02) 9521 4844 or visit www.avrevolution.com.au**

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# Oh Moya days!

If the height of your pandemic achievements — your honed banana bread recipe or hula-hoop PR, perhaps — was put into perspective by Taylor Swift writing and releasing two albums, or American comedian Bo Burnham's award-winning one-man musical, get a load of this: when Laurence Dickie, the speaker engineer behind the iconic Bowers & Wilkins Nautilus and now the technical director of the Vivid Audio brand he founded, was quarantined in a hotel room during the pandemic, he designed his dream loudspeakers: a five-way, 13-driver design that is now launching as Vivid Audio's new flagships, the Moya 1.

Look at the accompanying images and it's hard not to stare in awe at those proprietary side-firing bass drivers, of which there are eight per tower, each one capable of handling 800 watts and together horizontally opposed on either side of the cabinet. Vivid Audio found that extending the speakers' bass response also improved the perception of higher frequency bands, and so these bass units became even more pivotal to the design.

Each driver has a 22.5cm alloy diaphragm, with their magnets united by a substantial steel tie-bar to eliminate cabinet vibration and turbulence, negating the need for a heavier enclosure. Two drivers sit in each of the four braced bass enclosures and are complemented by reaction-cancelling modes with aerodynamically optimised bass ports.

On the front baffle are two 17.5cm carbon fibre-reinforced mid/bass drivers, above which is a single 100mm carbon fibre-reinforced midrange driver and two higher-frequency 'Diamond-Like Coated' (DLC) aluminium alloy modules — a 50mm upper midrange dome and a 26mm tweeter. The former benefits from tapered tube loading, which is one way to prevent sound waves at the back of the drivers from distorting the audio, and was a concept the Nautilus famously introduced before Dickie went on to implement it in every Vivid Audio speaker.

Of those higher-frequency units, Vivid Audio says that the contrasting properties between the DLC and the aluminium substrate "heightens shear losses and dampens the 'Q' of the break-up", going a long way to helping the Moya M1 deliver "audio thrills at every octave".

Every driver has been developed (and optimised) from the South African-based brand's existing signature carbon-reinforced sandwich composite, and is handmade in-house. Also built in-house are the computer-optimised, passive, hard-wired filters promising remarkable accuracy and phase matching.

Last but not least, the Moya M1 use a passive, five-way, fourth-order Linkwitz-Riley crossover in three parts, with the mid and upper sections placed well away from the bass ones.

If your subconscious hasn't been mulling over an asking price while you've been reading this, it will have at least screamed 'expensive'! Indeed, the Vivid Audio Moya M1 — launching this year in what is Dickie's 50th anniversary in speaker design — have an anticipated retail price of $750,000.

For more information, contact Avation on (07) 5580 3300 or visit www.avation.com.au

# A Nucleus for everyone

To complement its core business as a subscription-based music management software platform, Roon makes hardware servers for its users to store and stream their music library. The company, which was recently acquired by Harman, recently announced its flagship Nucleus Titan server (as featured in the last issue), and now is introducing a much more affordable model, the Nucleus One, to complete a two-strong lineup.

Roon promises audiophile sound quality and affordability from the Nucleus One, which costs $500 USD (approximately $780) — considerably less than the $6,299 Titan and the cheapest Roon server ever. It replaces the previous, pricier Nucleus server with "updated hardware" and a "cutting-edge performance" the company says is comparable to previous models.

The Nucleus One offers space for 2.5-inch internal SATA drives (SSD or HDD) for an 8TB storage capacity, which would accommodate roughly 10,000 albums or 100,000 tracks. There is also networked storage (NAS), two USB-A ports and one audio-only HDMI socket.

The Nucleus One can facilitate up to six zones of multi-room streaming, too, and underneath its matte black polycarbonate enclosure (which shares a likeness to the Titan's chassis) is an internal fan that assists cooling via dual vents concealed in the wings of the enclosure.

Speaking of Roon's aim for the Nucleus One, company founder Enno Vandermeer refers to its first Sooloos system from nearly 20 years ago: "That product had a five-figure retail price, and we've been on a mission ever since to develop something we could recommend to our friends and families. Nucleus One is the culmination of all our experience up to this point: a dedicated Roon server for the price of an off-the-shelf mini PC."

Roon's Nucleus One is expected in June.

For more information, contact BusiSoft AV on (03) 9810 2900 or visit www.busisoft.com.au

**LSX II LT** – The new addition to the award-winning LSX family. Same great sound, new lower price.

Designed as a streamlined version, LSX II LT shares the same immersive High-Fidelity sound and key technologies as the LSX II, at a price you'll love. Powered by KEF's Music Integrity Engine and signature Uni-Q driver array, this compact wireless HiFi speaker-system delivers unparalleled sound clarity. Effortlessly stream anything including AirPlay 2, Chromecast and Spotify, or seamlessly connect to your desktop, laptop, TV and more through HDMI ARC and USB-C inputs.

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# High End Munich 2024 show highlights

Europe's biggest annual hi-fi show has become a launchpad for new, aspirational two-channel fare, and the 41st edition held in May did not disappoint: high-end gear from the likes of Sonus faber, Arcam, Dali, Tannoy and Audio-Technica made their debuts, while a few 'real-money' surprises surfaced too...

## Radia expansion

Arcam created quite a stir when its new-look Radia Series of separates launched in October. The range introduced a fresh new design language for the brand and got off to a flyer, with seemingly good reviews across the board for the three stereo amplifiers and CD player.

At High End Munich 2024, the British company took the wraps off three additions to the range. First up are two premium streaming amplifiers set to give Naim's Uniti players a run for their money. Both the Arcam SA45 and SA35 feature Class G amplification, support hi-res audio and run off Arcam's latest streaming platform. They also include a switchable MC/MM phono stage for connecting a turntable and an HDMI ARC socket for hooking up a telly. You can even take advantage of a two-way aptX Adaptive Bluetooth module that allows you to wirelessly stream music directly to the system, or from the system to wireless headphones.

The SA45 is the more powerful of the two streamers (180 versus 120 watts per channel into eight ohms) and has a larger 8.8-inch hi-res display (versus the SA35's 6.5-inch one). Both models support Dirac Live Room Correction, for which a microphone and remote are supplied in the box.

Not content with two new launches, Arcam also drew the curtain on its latest flagship music streamer (without amplification), the ST25. Arcam says the network player builds on the success of its previous ST60 model, adding a new platform for digital audio and streaming, a redesigned power supply and an upgraded user interface.

The ST25 connects to your home network via Arcam's Radia setup app, and you can take your pick from streaming options — AirPlay 2, Google Chromecast, Spotify Connect, Tidal Connect and Roon are all present and correct. Like the SA35, the flagship features a 6.5-inch hi-res display.

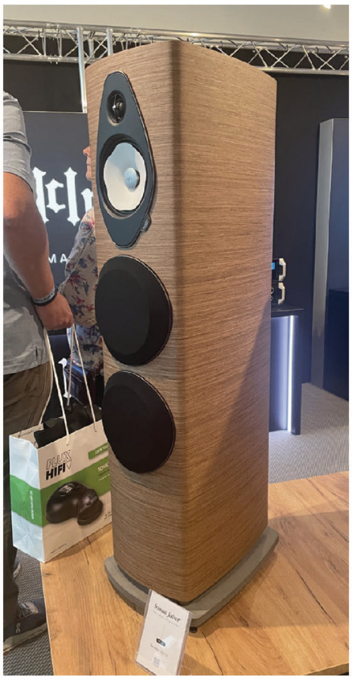
Interested? The bad news is that the Arcam SA35, SA45 and ST25 don't go on sale until September at the earliest, so there is a bit of a wait ahead of us. The plus side, of course, is that it gives you more time to start saving! Confirmed European prices are €3,499, €4,999 and €1,799 respectively, so that should give you an idea of Australian pricing.

## Supremacy trickles down

Sonus faber this year used the Munich stage to debut the second generation of one of its entry-level loudspeaker series. Sitting above only the Lumina Amator range, the new Sonetto G2 is a seven-strong, home cinema-friendly lineup comprising two standmounts, three floorstanders, a centre channel and a wall-mounted module.

'Entry-level' is relative of course, but considering Sonus faber revealed the $90,000 Stradivari speakers last Munich, and that its most recent release was the $1.4m Suprema speaker system (as featured in the last issue), the Sonetto G2's price range between $2,495 and $14,995 is fairly modest for the Italian brand.

Despite that, the Sonetto G2 still incorporates some of the new driver technologies and materials used in the prestigious Suprema. The top two Sonetto V and VIII floorstanders feature the system's new internal cork chamber, which has an entirely organic shape and is unlike regular interior speaker walls. It allows for a "seamless flow of sound waves within the chamber" and lets Sonus faber have more precise control over "sound propagation and resonance".



Both floorstanders and the centre channel sport the Suprema-derived Camelia midrange driver, too. And unique floral patterns surrounding the bass drivers are not just there for decoration but also to reduce interference. The tweeter used throughout the Sonetto G2 range is Sonus faber's own Silk Dome DAD (Damped Apex Dome), which the company claims delivers "exceptional clarity and detail".

The Sonetto I and II standmounts benefit from the clever "Intono" internal duct/pressure technology seen in the premium Amati and Serafino Homage. This combines the advantages of sealed and ported cabinets to prevent unwanted impedance spikes and midrange output losses.

Every model has a new concrete base for stability and better vibration management, and that familiar 'lute shape' cabinet (an ode to musical instruments) is complemented by a natural wood grain textured finish.

# BRICASTI DESIGN – A STATEMENT OF QUALITY AND PERFORMANCE

Bricasti Design is the Massachusetts-based, high-end audio company renowned for its exceptional expertise in crafting high-end audio equipment.

Founded by Brian Zolner and Casey Dowdell who both have significant experience in audio, having worked for years with companies like Lexicon and Mark Levinson. Their commitment to innovation and superior sound quality have established Bricasti Design as a leader in professional and consumer audio products.

Now, Bricasti's meticulously engineered products are revered across the globe by audiophiles and professionals alike for their pristine sound reproduction and unparalleled craftsmanship.

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Soundbites

## Wooden and analogue-warm

There's a certain logic to building headphones from the same stuff that made the music in the first place, which is exactly what Audio-Technica has done with the wood-encased ATH-WBLTD.

The 45mm drivers used by these limited-edition wired over-ears are housed in maple, walnut, and mahogany enclosures — three hardwoods often used to construct violins, guitars and mandolins due to their acoustic properties and ability to limit pesky vibrations. Those earcups are also hand-polished by Fujigen, a Japanese guitar manufacturer, so they absolutely look the part too.

Audio-Technica designed the ATH-WBLTD with analogue listening in mind, so as well as having a DLC-coated diaphragm, the drivers have been tuned specifically for analogue connections, delivering what the Japanese company claims is an "impressively responsive and expressive soundscape".

Two 1.2m cables come in the box: one with a 4.4mm connector, the other a standard 3.5mm jack. The usual 6.3mm adapter is supplied to maximise source compatibility.

Audio-Technica understands that while those layers of wood might make a pair of headphones sound good, it doesn't make them comfortable to wear without some padding, so the earpads and adjustable magnesium-alloy head-band are covered in sheepskin.

Just 300 pairs of ATH-WBLTD have been made, and as their announced UK price is £1,599, you can expect them to cost a few grand here when they arrive.

## Low-end at High End

It may seem counterintuitive to launch an entry-level range at a show that predominantly celebrates high-end gear, but this is quite a big deal for Q Acoustics. Its new 3000c speaker range is the latest generation of its most popular, most affordable and highly acclaimed 3000 series (following the 3000 and 3000i), and the first refresh in six years.

The 3000c series comprises three standmounts of increasing size, one floorstander, and a centre channel for building a surround sound package. Q Acoustics aims to deliver "a sonic performance and high-quality design and build way beyond its class" here, and key to that aim is the implementation of the Continuous Curved Cone (C3) mid/bass driver, which was first introduced in the step-up 5000 series and combines the advantages of a straight-sided cone with that of a flared one, aiming to deliver an improved bass that also better integrates with the higher frequencies. Q Acoustics claims the C3 driver allows you to position these speakers closer to walls, and says it is "more resistant to standing waves within the cabinet".

The cabinets feature point-to-point (P2P) bracing, which is another technology found higher up in the company's speaker lineup (namely its flagship Concept 300 and Concept 500 models) and aims to minimise low-frequency reverberation for superior imaging.

The tweeter used across the range is hermetically sealed and mechanically isolated from the front baffle, minimising the effect that vibrations generated by the mid/bass driver and internal pressure changes from the cabinet have on it. In the 3050c floorstander, Helmholtz Pressure Equaliser tubes (also trickled down from the Concept 500) aim to reduce the build-up of standing waves to lower distortion and improve frequency response.

All 3000c speakers will be available in four new finishes — Pin Oak, Claro Walnut, Satin White and Satin Black. That classic, minimal and clean look typical of Q Acoustics has been further refined with satin metallic driver trims. Expectations are that the range will be available in Australia later this year, with models priced between roughly $600 and $1,800.

## Signed, sealed… delivered later this year

In its almost 100-year history, Tannoy's crowning moment is irrefutably its invention of the dual concentric driver, which sees a tweeter sit in the throat of the mid/bass unit for consistent dispersion and improved integration and phase behaviour. In the 77 years since the British company debuted the innovation at the London Radio Show, this driver has featured in more speakers from Tannoy (and other manufacturers) than anyone could reasonably count. Indeed, it remains very much at the heart of the legendary brand's speaker lineup.

One of the earlier Tannoy designs to make use of the dual concentric was the GRF Autograph in 1954, some ten years before the company's famous Monitor Gold Dual Concentric range arrived. And now, Tannoy has flaunted a modern-day Autograph model ahead of its release later this year.

The new Autograph 12 speakers celebrate the 70th anniversary of the originals, which, you might remember, spawned a miniature sequel in the suitably named Autograph Mini in the early 2000s. The Autograph 12 look closer to the size and construction of the 1954 model, however, while Tannoy notes their suitability for "larger living spaces".

The Scotland-based brand will divulge full specifications and pricing of the new Autograph closer to the spring release date, so for now we know simply that the two-way designs marry a 12-inch version of the iconic drive unit with a "luxurious" walnut-veneered birch ply cabinet.

More generally, Tannoy says the Autograph 12 offer "notable contemporary features" alongside "cutting-edge technology". Do I spy front-panel settings (tone controls?), for one?

# More ‘kore

Dali’s reference $180,000 Kore loud-speakers, which launched back in 2022, have a lot to answer for. Firstly, the trickle-down technology from them helped to create the company’s more 'affordable' ($85,000) Epikore 11 floorstanders last year, and now we have an all-new Rubikore range that too gets a helping hand from those flagship beasts.

The surround sound-friendly lineup consists of two floorstanders (Rubikore 6, Rubikore 8), one bookshelf model (Rubikore 2), one on-wall model (Rubikore On-Wall) and an LCR speaker (Rubikore Cinema). Both the On-Wall and Cinema include a rotatable hybrid tweeter module to provide extra placement flexibility.

Across the range is a brand-new 6.5in double magnet mid/bass driver that uses Dali’s paper and wood fibre ‘Clarity Cone’; Rubikore 8 uses three per speaker while Rubikore 6 uses two.

Rubikore also incorporates Dali’s SMC (Soft Magnetic Compound) magnet material technology, which is designed to reduce distortion, flux modulation and eddy currents in the magnet system.

Besides developing a new mid/bass driver for the Rubikore series, Dali has also blessed it with a brand-new tweeter. This 'Low-Loss Dome Tweeter' is derived from Kore’s 'Evo-K Hybrid Tweeter' and features across all models. All models bar the Rubikore 2 get a hybrid tweeter that pairs this new soft dome unit with a planar magnetic tweeter. The standmounts make do with only the single dome unit.

Rubikore 8 and 6 also benefit from SMC Kore inductors used in their crossovers to minimise signal loss, while Rubikore 2, 6 and 8 also boast reflex ports to maximise efficiency and reduce air turbulence and noise.

The Dali Rubikore range comes in a choice of High Gloss Black, High Gloss Maroon, Natural Walnut and High Gloss White finishes and will have price tags that are far lighter and more palatable than the other ‘-kores’ — around the region of $2,500 to $12,000, I expect.

# Plenty of colour (in a good way)

Pro-Ject brought the colour to this year’s expo. The established Austrian audio brand took this year’s event as a chance to showcase a variety of its coveted turntables, both established and brand-new, including the never-before-seen Debut Evo 2 deck.

The sequel to the original Debut Carbon Evo, the colourful spinner boasts a number of important improvements and features which, Pro-Ject says, offer unparalleled value and quality at this very reasonable price point. The belt-driven turntable comes with Pro-Ject’s own moving-magnet Evo cartridge, plus an 8.6-inch carbon tonearm with sapphire bearings, which has supposedly been streamlined for greater tracking precision.

The Debut Evo 2 can track at 33.33, 45 and 78rpm speeds via an electronic switch and atop its resonance-resistant MDF chassis is a damped aluminium platter. It comes with a phono output that boasts gold-plated sockets, while a dust cover, felt mat and power supply are included in the box.

You’re not short on colour options, either, with Pro-Ject offering a choice of white, black, yellow, blue, green or wine red satin finishes alongside red, white or black gloss exteriors. If you want to go for a more natural look, there is also a classic walnut skin.

The Debut Evo 2 will cost €699 in its native Europe, with pricing in other territories to follow.

# Ahead of the curve

Say hello to Meridian’s all-new Ellipse. The company’s first wireless speaker utilises its lofty Digital Signal Processing technology and in Munich promised to deliver a satisfyingly 'hi-fi' sound befitting of a high-end audio show from a relatively tiny package.

When you’re at a trade show full of speakers and systems worth hundreds of thousands — sometimes millions — of dollars, it must be, as you might imagine, unnerving to be sat back ready to listen to a wireless speaker. This is the sort of product that, regardless of the brand name, plenty of people wandering around the show wouldn’t dream of bringing into their homes. Proper hi-fi? No chance. But enlightened by what’s now possible in a DSP-dominant audio world, why not see what an esteemed brand renowned for class-leading audio processing can deliver from a diminutive box?

Inside it is a simple, front-facing 2.1-driver design, each driver powered by its own amplification, with the clever stuff taken care of by Meridian’s DSP and the work done by its Extreme Engineering Programme, which also covers its big-boy loudspeakers.

Designed and built in the UK, Ellipse is the first Meridian speaker to feature the company's latest R2 electronics platform, a compact version of the R1 electronics platform and incoporating the same signal-enhancing trickery found in the $160,000 DSP8000XE and only slightly less extravagant DSP9.

You also get Meridian’s new, updateable high-end streaming platform, offering AirPlay 2, Bluetooth and Chromecast via the Meridian control app, as well as Tidal Connect and Spotify Connect. Around the back is a USB-C for wired playback of 24-bit/192 kHz audio, an optical for connecting to a TV or digital audio source, and a 3.5mm analogue connection.

All this clever Meridian wizardry naturally comes at a price, and that could be somewhere around $5,000 here.

# Topping DX9 Pro

## DAC & Headphone Amplifier

**+**
- Immaculate sound
- A plethora of connections
- Easily readable displays

**–**
- Lacklustre manual

**RRP** **$2,199**

Some five or six years ago, I began noticing talk online of Chinese manufacturer Topping. The brand appeared to focus on developing DACs and head-fi (headphone) electronics — nothing too surprising there. But the websites that scrutinise such things found stunningly good performance figures for these surprisingly affordable devices.

In late 2020 — oh, weren't those the days! — I found myself in need of a DAC and possessed fewer dollars than I would have liked, so I bought a low-cost Topping E30. It isn't a headphone unit: it simply takes an optical, coaxial or USB digital audio signal from a digital source component or computer and converts it to analogue to output through its line-level RCA sockets.

Later, I measured it. With 24-bit audio, the A-weighted noise level was close enough to -120dB. And everything else was equally good. Today, it remains the DAC that turns digital music on my desktop computer to line-level analogue, which in turn feeds my connected sound system: Dynaudio Emit 20 speakers on IsoAcoustic stands, driven by 100 watts per channel of Class A/B power.

The E30 cost just over $200, but here I'm going twelve rounds with Topping's latest premium model costing over ten times the price. The DX9 combines high-end DAC performance with a powerful headphone amplifier.

### DIGGING INTO THE DETAILS

The Topping E30 I own is a small box that isn't unattractive but clearly utilitarian in its intent. The DX9 Pro's design, meanwhile, is very, very different… yet still somehow quite utilitarian. The 340mm-wide unit is encased in an impressively solid aluminium body. Well, most of it is. The bulk of the top is a transparent pane of, I believe, glass, through which the main circuit board can be seen, and upon which is printed a lightly rendered block diagram showing the important sections of the circuit. (The image on page 20 illustrates this most clearly.) To this, I shall return.

Inside the unit, running along the top of the rear panel, is a row of fourteen amber LEDs that cast a glow across the innards, as you can see in the image above. I'm not sure I like it, but you might. You can adjust the glow's brightness in the DX9 Pro's settings to three levels, or switch them off entirely which, to my eye, makes for a cooler look, both figuratively and literally.

'TOPPING' is machined into the top panel, which also bears official 'Hi-Res AUDIO' and 'Hi-Res AUDIO WIRELESS' stickers, as well as a machined-in '15th Anniversary'. But besides the top-panel window, the most visually arresting feature is the rounding of the chassis sides.

Central on the front panel is a large control knob that you can turn to select the output level and navigate the settings menu, or press, with the press action assignable to one of several functions. At the far left is a standby button that also invokes the menu when pressed briefly, and

on the far right are three headphone outputs: an unbalanced 6.35mm, balanced 4.4mm TRRRS Pentaconn and balanced 4-pin XLR socket. There is no provision for the older 2.5mm TRRS balanced connection, so you will need the relevant adaptor if you have headphones with that termination. A 3.5mm-to-6.35mm adaptor for the unbalanced socket is handily provided in the box.

The large central knob is flanked by two 50mm colour LCD displays. By default, they display useful information about the settings and signal, but they can be set to display VU meters or FFT (a dynamic bar graph of the signal frequencies). You can choose between two VU meter styles: one shows blue segments on a black background, while the other looks impressively analogue, with a ‘needle’ over a traditional display and apparent uneven backlighting. From front on, the latter option looks real, though from a 45-degree angle or more, its flatness becomes apparent.

The VU and FFT graphics are fun, but the default information displays are extremely useful, the left showing the volume level, the right the input signal’s sampling frequency. (You can switch them around in the settings if you so wish.) Kudos to Topping for making these displayed numerals large in size, ensuring they can be easily read from a distance. Shown in smaller type are settings for the headphone and line-level outputs, gain (high or low), the digital signal format (PCM or DSD), the input source and the digital filter. Below each is a level meter showing the signal level for the respective channel via a thin, instantaneous bar and what appears to be a thicker, slower-moving averaging bar.

I harp on about this, but I believe it’s important to see the sampling frequency of an input on a DAC. After all, it’s easy enough to accidentally set a source to downsample the signal. And if you’re using a computer, ensuring that your software is correctly configured to deliver the native signal and not some computerised rendition of it can be a little tricky.

You can never really say that a DAC can handle *all* digital signals, but for all practical purposes the DX9 Pro can indeed accommodate every

**In addition to three front-panel headphone jacks are line-level outputs in RCA and balanced XLR flavours**

digital signal you might throw at it. The headline format support is PCM up to 32-bit/768kHz and DSD512. Delivered from a computer using the DoP (DSD over PCM) envelope, DSD64, DSD128 and DSD256 (that is, SACD standard, 2x and 4x) are supported. If your PC software supports *direct* DSD over USB, the Topping can also handle DSD512 (8x). The DoP limitation is due to the bandwidth constraints of USB Audio Class 2.0.

Speaking of which, while USB Audio Class 2.0 is the Topping’s default, you can change it to Class 1.0 within its settings. Up until a few years ago, Windows computers only natively supported USB Audio Class 1.0, which is limited to 24-bit/96kHz. Class 2.0 can go way beyond that. Later variants of Windows 10, all those of Windows 11, and macOS versions for many years support USB Audio Class 2.0, but you could be using, say, a Windows 7 device as your source. It is still wise to install the drivers available from Topping’s website even on up-to-date Windows machines, though, as they provide WASAPI and ASIO interfaces which allow for a direct connection between the music software on your computer and the USB Audio hardware.

If you’re a fan of MQA audio, you will likely be disappointed by the DX9 Pro’s lack of support for the format. I believe Tidal still offers an MQA library, but since it now also offers high-resolution streams up to 192kHz in the open-source — and less problematic — FLAC format, hardware support for MQA seems less relevant these days. In any case, the Tidal desktop app, and some streamers supporting MQA, can perform the initial MQA ‘unfold’ themselves. The Topping’s display will reveal the sample rate of the result.

The DX9 Pro’s input offering differs from that of many high-quality DACs in that there are lots of them. There’s the aforementioned USB for accepting audio from a laptop or computer; four S/PDIFs — two opticals (Toslink) and coaxials apiece; an XLR for the AES/EBU format (the professional version of S/PDIF, supported by some high-end consumer gear); and, lastly, an IIS/LVDS socket, which is physically similar to HDMI but electrically for a direct digital audio feed from digital sources. The format isn’t particularly well defined, so it’s implemented differently according to the manufacturer. There are four settings for this within the DX9 Pro’s

'Advanced Settings' that should allow it to work with most sources that also support it.

Finally, there is Bluetooth for wireless audio playback. The included antenna, which screws into the rear panel, facilitates this. In keeping with other high-quality aspects of the DX9 Pro, support isn't just for the 'vanilla' SBC and Apple-preferred AAC Bluetooth codecs but also the Android-preferred, higher-quality aptX HD and aptX Adaptive, plus Sony's quality LDAC. Those three codecs can 'handle' high-resolution formats but cannot wirelessly transmit them *losslessly* due to some compression.

While the DX9 Pro doesn't sport analogue inputs, there are, naturally, analogue outputs. In addition to the three front-panel headphone jacks are rear-panel line-level outputs in both stereo RCA and balanced XLR flavours, and pre-outs, also in XLR and RCA. I will get to the differences between these shortly.

## WHAT'S GOING ON INSIDE?

One of the transparent top panel's markings shows the location of the AK4499 DAC, which was Asahi Kasei's flagship chip until it was recently topped by the enhanced AK4499EX. This tiny chip is the crux of the DX9 Pro's design — not just facilitating its wide digital audio support but also the extreme dynamic range it offers.

Any DAC chip, no matter how high in quality, can be surrounded by substandard components or circuitry that reduce its performance. Not with the DX9 Pro. Topping publishes detailed measurements (the graphs can be found in the manual), and I've seen enough independent confirmations of them for its other products to accept them at their face value. Topping says that the A-weighted signal-to-noise ratio for the DX9 Pro is between 127dB and 132dB, depending on your choice of output, which are stunning figures given that the theoretical noise floor for 24-bit audio is -144dB.

I hasten to add that a degree of "so what" is appropriate. Sometimes for my own amusement, I play elderly pre-recorded audio cassettes on a 28-year-old cassette deck. In Dolby B mode, the SNR is, according to the deck's specs, 71dB. Even at that level, noise is rarely a problem. Things such as 130dB+ noise specifications are proxies for care in design and manufacture, and it's clear Topping has taken that care.

For example, there are six headphone modules inside, labelled on the transparent panel as 'NFCA' (Nested Feedback Composite Amplifier). Why six? Because each of the three headphone outputs has left and right channels, making for six channels in total. In other words, the Topping can drive three pairs of headphones simultaneously, each with its own independent amplifier — not that you would probably ever need it to. All headphone outputs share the same volume setting.

The headphone amplifiers are powerful, too. The unbalanced 6.35mm output goes from 240mW into 300 ohms to 3.3 watts into 16 ohms. For the balanced outputs, the range is between 460 milliwatts into 600 ohms and 10 watts into 16 ohms. That sounds like a lot of power, and it is. Let me translate that into decibels: the number of decibels you add to the 1mW sensitivity of your headphones (which is typically 90dB to 110dB, albeit much higher for some in-ear monitors). For unbalanced headphones, that range is between 24dB and 35dB; for balanced it's 27dB and 40dB. Even high-impedance, low-sensitivity headphones manage at least 114dB SPL.

Importantly, the headphone output impedance is specified as less than 0.1 ohms. That is good, as higher output impedances result in an uneven frequency response with most headphones.

## SETUP

Setting up the Topping DX9 Pro initially seemed straightforward. Plug everything in, including the hefty mains power connection, and you're good to go. Press the front-panel knob to cycle through the inputs, turn it to change the volume, and you're on your way.

As indeed you are... but with one caveat. The default settings are likely to be an issue for someone who wants to use the DX9 Pro as a straightforward (albeit particularly high quality) DAC for a main audio system as well as a headphone amplifier, thus requiring to switch between the two functions. But I will get to that momentarily, because the first stumbling block was the absence of a proper manual in the box. There was simply a card with a URL (and QR code) for a Quick Start Guide, User Manual and Warranty Terms. I downloaded the manual. As manuals go, this one is pretty slim and basically just labels the controls, displays and connections and lays bare the setup menu options in minimalist fashion. Some of it was quite confusing. For example, should you connect the pre-outs or line-outs to a power amplifier? The diagram suggests the latter, but that seems counterintuitive since you would expect line-outs to deliver a fixed (high) output level, and the pre-outs to be subject to the volume control. Again, this turns out to not always be the case, which again I will get to below.

If you're plugging a CD transport, audio streamer or perhaps even a TV into the DX9

The DX9 Pro can accommodate every digital signal you might throw at it... DSD512 and 32-bit/768kHz

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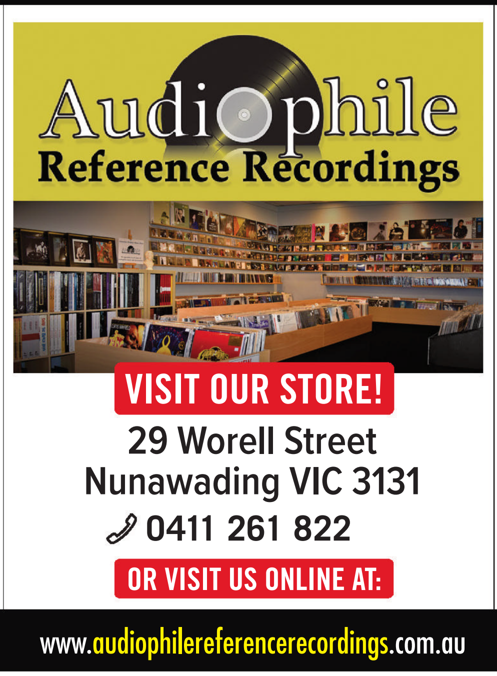
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**Sound was, quite simply, as good as it gets… nothing within the signal seemed obscured or hidden**

Pro's various inputs, things will be pretty straightforward. But with a Windows computer as a source, you really ought to install the Topping drivers, as I've mentioned. All my computer listening was using the ASIO (Audio Stream Input/Output) driver.

## SIGNAL SUPPORT

The Topping documentation didn't mention MQA support, but the 18 MQA test tracks on my computer all fed bit-perfect to the DX9 Pro. They came through sounding quite fine indeed, though the display showed 44.1kHz or 48kHz as the sampling rate, rather than the higher figure some should have exhibited had they been detected and unfolded.

So I've disposed of MQA. That leaves, well, everything else…

Let me start with the optical and coaxial digital audio inputs, which supported all my audio tracks from 16-bit/44.1kHz to 24-bit/192kHz. There has been some suggestion of lesser Toslink capabilities in recent times, due to Toshiba's apparent exit from the market. In any case, 24-bit/192kHz material worked fine across all four S/PDIF inputs.

A USB connection to a computer offers significantly higher-resolution support. With the Topping Windows USB driver already installed for the E30 (the same was required for this unit), I tested PCM signals from 16-bit/44.1kHz right up to 24-bit/768kHz! And that included a 705.6kHz signal. (Remember, almost all PCM audio files are multiples of either 48kHz or 44.1kHz.)

In case you are wondering, there is, as far as I know, zero music available with either 705.6kHz or 768kHz sampling rates. I've created my own at those resolutions solely to see if they work. I won't testify to their fidelity, beyond that they sound normally natural and suffered no breakup or other delivery problems. Seeing as the microphone I used to record them probably didn't capture much beyond 20kHz, that's not really a surprise.

There are no apparent limitations with DSD either. My Windows computer happily fed standard (SACD-like) DSD64 to the DX9 Pro, plus DSD128, DSD256 and indeed DSD512, with the music player software set to native mode. I believe some people suggest that DSD1024 is somehow better. Topping does not claim that the DX9 Pro supports this, nor do I have any such test tracks. Topping agrees that this falls to DSD256 in DoP. As early USB implementations didn't allow regular DSD to be transferred to output devices, DoP packaged the DSD signal in such a way that the computer read it as a standard PCM signal. It included an appropriate flag within the data, so a DSD-capable DAC would notice this flag, extract the DSD data from the stream and set it for DSD decoding.

I checked file compatibility on my Mac Mini as well, and its Audio MIDI Setup app reported that the DX9 Pro supports both 24- and 32-bit digital audio from 44.1kHz to 768kHz. All of my test tracks — all 24-bit — worked rather nicely, and so did DSD up to DSD256. The software I use, JRiver Media Center, offers 'native' DSD playback in its Windows version, but only DoP in its macOS iteration.

## LET'S START LISTENING!

I spent a long time with the Topping plugged into my main system, which comprises a Moon 330A power amplifier driving Dynaudio Contour 20i speakers, with sources alternating between a Cambridge Audio CXC S2 CD transport (coaxial), WiiM Pro music streamer (coaxial) and TV (optical). My regular DAC, to which my ears are attuned, costs more than twice the DX9 Pro, although it does also offer music streaming.

The DX9 Pro's sound was, quite simply, as good as it gets, to the point that if you find another very high-quality DAC, you're unlikely to be able to tell the difference between them. I'm not sure I could. Both the Topping and my system DAC delivered superb musicality and detail, and nothing within the signal seemed in any way obscured or hidden. I honestly do not believe there was anything left to divulge by either unit.

That applied as much to their decoding of the 16-bit/44.1kHz signal from the Cambridge Audio disc spinner as it did the 24-bit/96kHz or 192kHz Tidal streams and music files on my NAS drive.

To labour the point, the DX9 Pro is not only much less expensive than my basline DAC but also somewhat more practical *and* adds a high-end headphone amplifier.

But what I want to spend more time on is the DX9 Pro's headphone outputs, since their sound quality is equally affected by the DAC section as well as the headphone amplifiers.

## SETTINGS ISSUES

I had a problem for a while, which was in part down to the manual's skeletal nature but also my previous experience of Topping DACs. With the latter, you could typically choose their output to be either 'Pre' (where the volume control sets the volume level) or 'DAC' (where the output level is fixed at the maximum of, typically, something like 2 volts for 0dBFS).

But the DX9 Pro has *two* sets of outputs — one labelled 'Line', the other 'Pre' — and yet you can still set the output to 'Pre' or 'DAC' in the settings. I spent quite some time experimenting with various combinations of settings in an effort to find differences between the two settings for the two pairs of non-headphone outputs.

But whatever I did, the volume control remained operational. The only difference was that the Gain settings (high or low) applied to the headphone and pre outputs but not the line ones.

Eventually, I resorted to an online forum, which solved my problem. It all depended on what you chose for the 'Out mode' in the setup menu — either of the line outputs, the headphone outputs, or 'All'. Since I was using

the DX9 Pro to drive both my speaker-fronted system and headphone-orientated desktop one, I had reasonably selected 'All'.

But it turned out that the fixed (maximum) level for the line outputs only worked when the 'Out Mode' was set to 'Line Out', and DAC operation was selected in the Advanced Menu. Instead of a variable negative dB value on the left-hand display, it showed a large 'DAC', and the line output level was set to max (with low gain). The pre and headphone outputs were both off.

With 'Line Out' and 'DAC' modes set, I got proper volume from my speakers — voilà! I then switched the output to 'HPA' for the headphones and set the level to -35dB, which was comfortably loud through the headphones I connected — all good there!

But then I switched between those two output modes for some additional checks, pressing the button to cycle through them all, and when I reached 'All' my poor, poor headphones began rattling wildly as their drivers bottomed out. They only suffered for a second as I quickly pressed the button to switch to the next mode, and fortunately they weren't on my head and do appear to have survived — but I was glad I had been using my second-best (and not *very best*) pair!

You see, the last time I had used 'All' mode I'd left it at 0dB, so the maximum output fed the headphones when I briefly landed on the mode again. *And* I had Gain set to high, so it was doubly bad. Kind of dangerous!

It's easily overcome once you realise this, though. Since you can't change the order through which the output modes cycle, you should turn down the volumes for the 'All' setting to a level comfortable with headphones. You can then switch between DAC and HPA modes with no fuss and no danger to either ears or equipment.

For a while, I considered a potential safeguard: the inclusion of a traditional switch on the headphone input that mutes the other outputs when headphones are connected. That would work with the 6.35mm socket, and perhaps too for the 4.4mm one if it had an insertion switch, but not the 4-pin XLR. Different behaviours between the various headphone outputs would prove just as problematic.

This essentially comes down to an inadequate manual: there should be appropriate guidance and warnings therein.

## DIGITAL FILTERS

Now, before getting to my final section on headphones listening with the Topping, I should add a word about filters. Unlike my comparison DAC, the DX9 Pro offers selectable output filters — like many DACs and other higher-end digital components from within the past decade do. Proper reconstruction of the analogue signal from PCM digital audio requires the application of a low-pass filter as the last stage of processing. Likewise for DSD. (Yes, the official SACD specification calls for a filter at 50kHz). This can be implemented in various ways. Traditionally, digital device manufacturers choose one themselves, but those like Topping let you pick between several. Here, six are on offer and can be cycled through by pressing the remote control's 'FIR' button.

The default option is 'F-3: Short Delay Sharp Roll off', while alternatives include 'Slow Roll off', 'Short Delay' and 'Super Slow Roll off'. I won't pound this point too much, but if you want the most accurate reproduction of a digital signal — and why wouldn't you? — you should use 'F-1: Sharp Roll off'. It's essentially the same as the default but without the short delay.

'Super Slow Roll off' would be my last pick. Some reviewers swear that various slow roll-off filters sound superior to the sharp ones. Me? I think they all sound the same, but measurements clearly show that slow filters

**TECH SPECS & CONTACT**

**Brand:** Topping
**Model:** DX9 Pro
**RRP:** $2,199
**Inputs:** 1x USB Audio Class 1.0/2.0, 2x coaxial (RCA), 2x optical (Toslink), 1x AES/EBU (XLR), 1x IIS/LVDS (HDMI), Bluetooth
**Outputs:** 1x unbalanced headphone (6.35mm), 2x balanced headphone (4.4mm TRRRS, 4-pin XLR), 2x unbalanced stereo RCA (variable level output, fixed available for one), 2x balanced stereo XLR (variable level output, fixed available for one)
**File support:** PCM 16-bit to 32-bit up to 768kHz, native DSD to DSD512
**Unbalanced headphone output (<1% THD+N):** 2x 240mW @ 300 ohms to 2x 3300mW @ 16 ohms
**Balanced headphone output (<1% THD+N):** 2x 460mW @ 600 ohms to 2x 10,000mW @ 16 ohms
**Accessories:** Remote, USB & power cables, Bluetooth antenna, 3.5mm-to-6.35mm adaptor
**Dimensions (hwd):** 6.2cm x 34cm x 23.4cm
**Weight:** 2.75kg

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reduce the high-frequency levels. 'Super Slow Roll off' is sometimes known as NOS (non-oversampling), and if it were simply a return to the straightforward R2R digital-to-analogue conversion of the early days of CD, albeit with the greater precision afforded by several decades of development, that would be one thing. But with the Asaki Kasei DAC chips I've previously examined, this also eliminates the output low-pass filter, leaving significant amounts of ultrasonic noise in the output. Audible? Probably not, but nonetheless it could be a burden to tweeters and is fealty to a false ideology, which some people somehow manage to imagine is an 'improvement' in the sound.

## HEADPHONE LISTENING

I mentioned my second-best headphones earlier. They are Focal's Elear headphones — a dynamic model and generally nicely balanced. My best headphones are Final Audio's planar magnetic D8000, which I happily paid thousands of dollars for, for their superb balance, detail and openness.

But I kicked off my listening sessions with my good old Sennheiser HD 535, which are now getting on for 30 years old. These are, like my other two pairs, open-backed, and also dynamic like the Focals. (While I've since enjoyed, reviewed and owned more recent Sennheiser headphones, I continue to favour these. They have offered consistent comparison over the decades, too.)

As I'm writing these words, the HD 535 are plugged into the DX9 Pro's 6.35mm socket (via a 3.5mm-to-6.35mm gold-plated adaptor), with my Windows computer feeding the DAC via USB, and JRiver Media Center delivering the album 'Moanin'' by Art Blakely & The Jazz Messengers. This is a 1959 recording, and while I own a modern pressing on vinyl, I'm listening to the 24-bit/192kHz FLAC version from Blue Note. Old recordings such as this tend to have a naive quality to the capture of the sound that lends a real authenticity.

The Sennheisers are fairly high in impedance — 150 ohms, nominally — and fairly low in sensitivity, so while they work fine with portable players and the like, they really come to life with a quality source possessing a good amount of oomph. I see on the DX9 Pro's display that I've dialled up the volume level to -12.5dB (Gain setting on low, so some 15.5dB more sound is available). That really brought the headphones to life. Yes, they remain a little treble-prominent, but I could hear everything with impeccable clarity.

I plugged in the Final Audio headphones to see what they could do with this same sound. Firstly, they were much, *much* louder. That makes sense: you get more power due to their 60-ohm impedance, and more sound because of their higher sensitivity. Yet the delivery was utterly coherent and, as expected, less distorted than it had been through the Sennheisers.

OK, time for something recorded with more modern technology...

Let me present *Authentic Celestial Music* from 1998's 'Ocean Songs' by the Australian trio Dirty Three. This ten-minute track relentlessly builds and builds, but rendered by Tidal at 16-bit/44.1kHz, this building seems limitless. Within what could be construed as a 'wall of sound' as the climax approaches, every tiny detail managed to contribute to the whole while remaining individually discernible. Bass notes had an entirely satisfying authority, and perfect integration with the higher frequencies — but I wanted to check its quality with something a little more metronomic too.

As far as I've seen, no reviewers of high-fidelity equipment other than me use the group Primus as test material, which I think is unfortunate. I played *Those Damned Blue Collar Tweekers* from their 'Sailing the Seas of Cheese' album (could the seemingly trivialising titles be putting reviewers off?), and I was presented with impeccable timing and bass seemingly without limit. Likewise for the band's *The Pressman* (from 'Pork Soda'), which periodically jumps from quiet-ish sections to no holds barred. With an indicated -13.0dB on its display, the DX9 Pro delivered the track immensely loud and satisfyingly through the Final headphones.

Perhaps the most important aspect of the performance was its control: there was zero discernible overhang when the music came to a hard pause, nor within its internal tiny pauses. There was air within the wall of sound.

**The DX9 Pro delivered the track immensely loud and satisfyingly through the Final D8000 headphones**

I figured I should run classical music through the DX9 Pro and my favourite headphones, and on my NAS drive stumbled upon the 'Passacaglia for Orchestra' (Webern, Karajan, Berlin Philharmonic). I'm not a huge fan of Webern — I believe he could have been astonishingly great, had he not been diverted into the atonal dead end of the early 20th century (thanks Schoenberg) — but for my purposes, the delivery of this piece was simply immaculate. The work features several extremely dense sections, yet instruments were precisely positioned and easily discernible within the mix. I don't believe it could be conveyed better by any electronic device.

To be as comprehensive in headgear as possible, I switched over to a fourth pair of headphones — my favourite in-ear monitors, the AudioFly AF180 Mk 2. Despite their compact size, these earbuds are three-way, four-driver designs, those drivers all balanced armature, with two employed for bass on each side. I fitted appropriately sized memory foam eartips and headed over to some of my favourite progressive rock from the '70s. At the time of writing, 'Dark Side of the Moon' apparently reentered the US Billboard 200 charts for the 989th week thanks to the recent eclipse visible in parts of America.

The 24-bit/96kHz remastered version from the 2011 'Immersion' release was stunning (I'd ripped it from the DVD to my NAS drive for convenient playback). Yes, there was a little white noise. Its absence from a brilliant 1973 recording would indicate significant digital processing. It soon became apparent that a narrow band of highish frequencies, those triggered by male vocals on *Breathe (In the Air)*, rang a little piercingly. It turned out to be just that track, though, and checking with other headphones and IEMs made it clear this was an IEM issue and not a DX9 Pro one.

That turned out to be the only issue. As I approached *Money*, I wound up the volume control to indicate -18dB (Gain still on low), and quite frankly I've just spent the last six-and-a-half minutes sitting here entranced by one of the true heights of progressive rock played back flawlessly through the Topping/AudioFly pairing.

I could go on… I spent some time with King Crimson, Béla Fleck, The Doors, the Austin Benjamin Trio, Vladimar Ashkenazy playing Beethoven piano sonatas, through all four pairs of headphones, and in every case the performance was impeccable. I daresay unsurpassable.

A final practical note: if an alive computer isn't plugged in, by default the DX9 Pro places itself in standby mode after receiving no signal for several minutes. It will wake up upon detecting a signal on any of the S/PDIF inputs (I couldn't check the IIS or AES/EBU). I rarely had to touch the remote control.

## CONCLUSION

If you want a truly high-quality DAC and (digital-signal-only) headphone amplifier, you can't go wrong with the Topping DX9 Pro. Just take a little time to set things up properly, as I've described, so it works the way you need it to.

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Google the word 'Adcom' and the first generic 'People Also Ask' question the search engine serves up is 'Is Adcom still in business?'

Adcom certainly still is in business, though rather than operating out of the United States, where the company was founded by Newt Chenin (see our column on Adcom's history overleaf), it now operates out of Thailand. It's owned by Everest World Company Ltd, which purchased the rights not only to the Adcom brand but also to Adcom's intellectual property, including its circuit designs. Since these were pretty good designs (which is hardly surprising considering that, at one time or the other, world-famous circuit designers including Morris Kessler, Ed Miller, James Bongiorno and Nelson Pass each had a hand in them), Everest has pretty much stuck with those designs, despite a few being fairly long in the tooth now. Adcom's glory days were, after all, last century!

That said, Everest World Company does not build the amplifiers itself, subcontracting the manufacturing process to third parties — just as Chenin did when he founded the company. And before you roll your eyes, you should know that many very famous amplifier brand owners do exactly the same thing. Indeed I'd venture to suggest that more so-called 'British' amplifiers are now built in China and Taiwan than are made in Great Britain. For example, Anthony Michaelson used Taiwan as his manufacturing base back when he owned Musical Fidelity.

Somewhat surprisingly, however, Everest doesn't appear to manufacture in Thailand

but instead goes further afield. It also splits production between different parties. Adcom's GFA-585se, for example, is (or was, the last time I checked) manufactured in Taiwan by Resonance Electronics, while its GFA-5500 was built in China by Quality Technology Electronics. The GFA-5705 reviewed here is made in Taiwan, presumably by Resonance Electronics.

## THE EQUIPMENT

The GFA-5705's sheer size (22 x 43 x 45cm) and weight (37kg) should be sufficient hints that it is a conventional, all-analogue Class A/B design driven by a conventional, all-analogue power supply — no Class D output stages or switch-mode power supplies are to be seen. In other words, the GFA-5705 is an 'old-school' amplifier — all full five channels of it.

As you can see from the accompanying images, its industrial design is also pretty old-school. Apart from its copious quantities of fluting/heatsinking, the chassis is basically your classic black box. Accompanying the red 'protection' and green 'power on' LEDs, the only control on the front panel is a simple two-way toggle switch that turns the amplifier on (when pushed upwards) and off. This upward/downward orientation is, of course, exactly the opposite of what we would expect it to be here in Australia (and in the UK), where the convention for power switches is the down position is 'on'.

There is some debate as to why the US uses the 'down is off' convention. One argument I've heard relates to human nature: if we're awake or excited we're said to be 'up', whereas when we're asleep or sad we're said to be 'down'. Another argument is that it stems from the English language's well-known expressions 'start it up' and 'shut it down'. And the last is that it's actually a safety system: if something goes wrong, it is easier to press a switch down than it is to lift one up.

My real gripe is not the orientation of the switch *per se* — you would get used to that very quickly — but that it would be so quick and easy to change on the models destined for Australia and the UK.

Around the rear of the GFA-5705 are five line-level inputs, each of which can be driven by an unbalanced or a balanced line. Alongside each of the XLR and RCA input terminal pairs is a small toggle switch for selecting your preferred configuration. I strongly recommend using the balanced inputs, for which you would set the toggles to their 'down' positions.

The five pairs of speaker terminals at the bottom of the panel are colour-coded, multi-way, gold-plated types, and although they're not actually labelled in any way other than (+) and (–), meaning you can't really be certain which channel is which, the layout is as you might expect; they run one to five from left to right, in the same way the channel inputs are arranged.

The rear panel accommodates another power switch (again with that upside-down orientation!), while a three-position slider lets you choose how to power the unit — by manually selecting 'on' and 'standby' operation via the front-panel switch; by using 'auto on/off' functionality through signal sensing; or by using an external 12-volt DC trigger voltage. While you should obviously choose the system that works best in your specific set-up, I would recommend using the signal-sensing option where possible.

I very much appreciate Adcom's consideration to provide two carrying handles on the back of the unit, though the GFA-5705's sheer weight, and how that weight is distributed asymmetrically over the chassis, still make handling very awkward. That said, it would be considerably more awkward if there weren't any handles!

## A PEEK INSIDE

The GFA-5705's power supply comprises an extremely large (1.7kVA) toroidal transformer whose secondary windings feed the five channels of amplification, each of which has 30,000µF of capacitance (for a total of 150,000µF), provided in the cylindrical form of Rubycon electrolytics. The output devices are TO3-type metal-cased bipolar output transistors (three pairs per channel) configured in a triple-Darlington array (also known as a 'high-current triplet'). These output transistors are safeguarded by an overload protection circuit that activates a relay in the events of a short-circuit, excessive current flow or if DC appears on the output terminals.

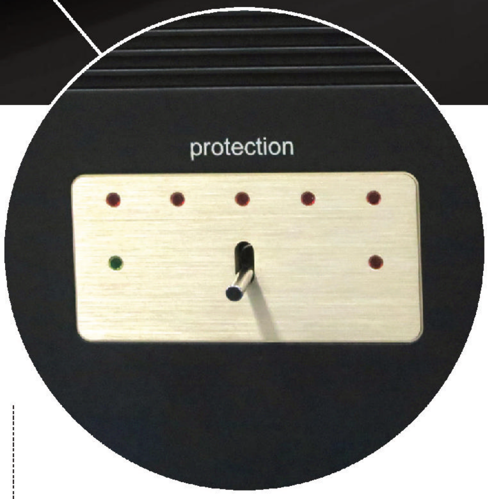
The GFA-5705 also boasts a thermal protection circuit that shuts the amplifier down if excessive temperature is detected on the heatsinks for the output transistors. If either of these two protection circuits needs to step in, a red LED on the front panel glows.

Adcom makes a special note in the manual that users should: 'Be certain to exercise extreme caution when making connections to and from the amplifier. Always make certain that the amplifier is disconnected from the AC outlet and its large filter capacitors are discharged. Note that the power supply capacitors can take more than 12 minutes to discharge. Failure to observe this precaution may result in damage to the loudspeakers and/or blowing of the amplifier's AC rail fuses, conditions which are NOT covered by the warranty.' I would like to add that not paying attention to this warning could also result in the output transistors being destroyed — an expensive event that would not be covered by the amplifier's two-year warranty.

## IN USE AND LISTENING SESSIONS

I started my listening session using only two of the five channels, predominantly because I'm far more familiar with my stereo music sources than with my multi-channel music and movie soundtrack sources. Although I could have used

**It is a conventional, all-analogue Class A/B design. An 'old-school' amplifier — all full five channels of it**




## Adcom history

Adcom was founded in 1979 by Newt Chenin who was, at that time, working as a sales rep for SAE, one of the most famous amplifier brands in the US back then. Adcom was actually his side hustle: whenever he visited a dealer to take orders for SAE amplifiers, he would also take orders for Adcom phono cartridges. For the record, SAE was fine with this because it didn't sell anything turntable-related so there wasn't a conflict of interest. The Adcom name itself was apparently Chenin's private joke: it came from the fact he was getting 'added compensation' on top of his salary paid by SAE.

When Chenin finally got around to releasing an amplifier under the Adcom brand, it was actually just an SAE model that was rebadged 'Adcom' and given a new model number: GFA-1. Enter another of Chenin's wordplays: 'GFA' stood for 'Great F*cking Amplifier'. That wordplay stuck when he added a preamplifier (the GFP-1) and a tuner (the GFT-1) to the range.

As you might have guessed, by the time Chenin had added these extra components, he had indeed resigned from SAE and was running Adcom as a standalone business. He wasn't, however, building or designing the components himself; they were being manufactured for him by a company called Amplifier Technologies Inc. which, not so coincidentally, also built SAE amplifiers (as well as models for the likes of B&K, BGW, California Audio Technology, Outlaw Audio and Theta Digital).

**The front panel is a heavy-gauge, high-grade aluminium extrusion, finished and anodized for durability. The chassis, top cover and rear panel are heavy-gauge steel, painted and baked.**

any two channels for this purpose, I chose the first and second as I imagined that this would be the worst-case scenario in terms of channel balance and separation.

It turned out that I was wrong about this being the worst-case scenario; balance and separation between the two channels were both absolutely superb. I then tried other combinations — the first and third, first and fourth, second and fifth, and so on — only to find that channel balance and separation were superb no matter the configuration. This shouts out excellent design and quality control from the rooftops. The album I used to establish this was Pharaoh Sanders' 'Thembi' from 1971. Right from the opening (and best) track on the album, *Astral Travelling*, you can hear how the sounds pan meticulously across the channels — the illusion is totally magical. You can also hear how sounds in one channel are entirely isolated within it; there is no bleed to the other. And when a sound is centred, it's completely focused centre stage. The imaging is truly perfect. I admired, too, the way percussion was very obviously at the rear of the stage, the soundfield's sense of depth truly precipitous.

I skipped the following track, *Red, Black and Green*, like I always do — and recommend you do too as it's a truly awful track, one of the worst assemblages of sounds (I couldn't call it 'music') I've ever heard… and it goes on for over eight minutes! I continued instead with the album's title track, which features Cecil McBee's lovely double-bass intro setting the scene for when

## 'Dark Side of the Moon' in multi-track will sell you on the extra channels; you'll never play the stereo version

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iTRON VERSION.
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**When a sound is centred, it is completely focused centre stage. The imaging is truly perfect**

Sanders' saxes enter the fray. The percussion is amazing throughout; you really can't beat the sound and complexity of African percussion.

If you'd like something more familiar with which to scrutinise stereo imaging, channel separation and balance, I recommend listening to Pink Floyd's *Money* from 'Dark Side of the Moon'. I did… but then I use this album for every component I review! However, I used my 5.1-channel version on SACD on this occasion so that all five channels of the Adcom GFA-5705 could be driven. As I've said on previous occasions, if you've ever wondered whether it's worth investing in a multi-channel audio system, just one audition of 'Dark Side of the Moon' in multi-track will sell you on the extra channels; you'll never play the stereo version again! The sensation of having a soundfield totally envelope your being is simply extraordinary. Tracks such as the aforementioned *Money* and *The Great Gig in the Sky* become true concert hall experiences. This is hardly surprising since the sound you're getting behind you from a multi-channel presentation is exactly what you should be hearing, rather than the approximation you hear when depending on room reflections (as is the case with any two-channel system).

Since I had been itching to test the five-channel power delivery of the GFA-5705 since starting the auditioning process, I decided that Deep Purple's classic 'Machine Head' from 1972 would be ideal test material. Anyone with a surround sound system would be mad not to own this album on SACD. It's supposedly available only in Japan, but I got mine from my legendary local Sydney store, Birdland… so I don't know what that's about. I cranked the volume as far as I dared during *Highway Star,* and the Adcom immediately flaunted its greatness — the presentation was totally effortless, completely free from distortion and, once more, totally immersive. The bass line driving the track was gut-punchingly real and the drum sound precise, immediate and perfectly paced.

The GFA-5705 was also easily able to recreate the depth and tone of the bass guitar on *Smoke On The Water* whilst still retaining the instrument's 'stringiness', something I always listen out for when auditioning this track. The bass lines Roger Glover created for this song are so innovative and inventive that it's a shame so many listeners concentrate on the chord sequence (so iconic it was back in the '70s that music stores used to ban customers from playing it), which *Wikipedia* describes as 'a four-note blues scale melody in G minor harmonised in parallel fourths'. Ritchie Blackmore, who played it on his Fender Stratocaster, claimed it was actually based on an inversion of Beethoven's Symphony No. 5, reportedly saying "I owe him a lot of money".

Later in the album, I admired how well the Adcom delivered the sound of *Space Truckin'*, specifically the reality of the texture and delivery of Ian Paice's inventive drum solo. Album closer *When a Blind Man Cries* is a criminally underrated track, but the Adcom elevates it right from the get-go, with the tapped hi-hats followed by the cymbals, after which it delivers Ian Gillan's vocal with unrivalled purity. The sound of the sustained guitar strings dies away so smoothly, too, retaining their exact tonality despite differences in volume level.

Since the neighbours were away, I hauled out another album that positively demands playback at ear-bleeding levels: Black Sabbath's 'Paranoid'. Thankfully, this is also available in a 5.1-channel presentation. Album opener *War Pigs* revealed, rather surprisingly, how noiseless the Adcom GFA-5705 can be. The track's sound is often syncopated with rests so that you'll hear a single sound, then total silence, then another single sound out of the silence, and so on — and the silences were completely silent. I couldn't have asked for more. I like this track rather more than the title one, which follows it and is more famous (and for the record, *Iron Man* is also a better track). But I have to say that the GFA-5705 delivered *Paranoid* fantastically well. You can also hear how delicate the GFA-5705 can be when listening to *Hand of Doom*, particularly during its understated intro, but once again it's the channel separation that I'm left admiring, plus the purity of Geezer Butler's bass and how well you can hear his string-bends.

I should note that after several hours of auditioning at very high volume levels, I noticed the chassis becoming a little warm to the touch, but I *was* listening midway through an Australian summer in a pretty warm room without air-conditioning. As with any high-powered amplifier, you should ensure you provide the Adcom with adequate ventilation.

Since the GFA-5705 will most likely find a home in a surround sound cinema system, I was sure to listen to it with movie soundtracks for the sake of review completeness. One of my go-to scenes is in 'Blade Runner 2049' where K and Joi fly from Los Angeles toward the orphanage, and if an amplifier is doing what it should do, the sound of the waves crashing against the flood barrier should sound spookily real, as should that of the driving rain on the windshield. The GFA-5705 was obviously doing its job perfectly, as I found these, as well as the other storm sounds, totally menacing, from the rumbles of rolling thunder to the intensity of lightning strikes.

I finished up my auditioning by returning to two-channel and listening to an album I've played multiple times per day since it first became available, Taylor Swift's 'The Tortured Poet's Department'. It's just so gorgeous — sonically, lyrically and musically — and a tour de force for Swift. Some of the lines are destined to become classics, including: 'But you're in self-sabotage mode/Throwing spikes down on the road/But I've seen this episode and still loved the show/Who else decodes you?'

And get a load of the line: 'I laughed in your face and said/You're not Dylan Thomas, I'm not Patti Smith/This ain't the Chelsea Hotel/we're modern idiots'. It was upon hearing these lines that I knew for certain I was in the sonic presence of a master lyricist. Yep, she can sometimes go over the top and there are plenty of lyrical misses in the album, but when Swift nails it, it stays nailed. I don't have this album in a high-resolution format yet, but even in low-res quality the formidable GFA-5705 proved its greatness.

## CONCLUSION

If you're in the market for a five-channel amplifier to be the heart of either a dedicated multi-channel music system or a multi-channel home theatre setup, scribble the Adcom GFA-5705 on your shortlist. Sure it's very big, very heavy and certainly doesn't come with any frills. But it's enormously powerful, totally silent and sounds great. It is, as its model name alleges, a great effing amplifier! ***Greg Borrowman***

**TECH SPECS & CONTACT**

**Brand:** Adcom
**Model:** GFA-5705
**RRP:** $5,799
**Warranty:** Two years
**Power:** 200W (5 channels, 8 ohms); 300W (5 channels, 4 ohms)
**Frequency response:** +0. -0.25dB, 10Hz to 20kHz (1 watt, 8 ohms)
**Input sensitivity:** 1.8V rms (200 watts, 8 ohms)
**Dimensions (hwd):** 27.5cm x 48cm x 56.5cm
**Weight:** 37kg

**Distributor:** NGP Distribution
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Kirribilli NSW 2061
**T:** 0403 456 154
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# Laboratory Test Report

Readers interested in a full technical appraisal of the performance of the Adcom GFA-5705 Multi-channel Power Amplifier should continue on and read the LABORATORY TEST REPORT published on the following pages. Readers should note that the results mentioned in the report, tabulated in performance charts and/or displayed using graphs and/or photographs should be construed as applying only to the specific sample tested.

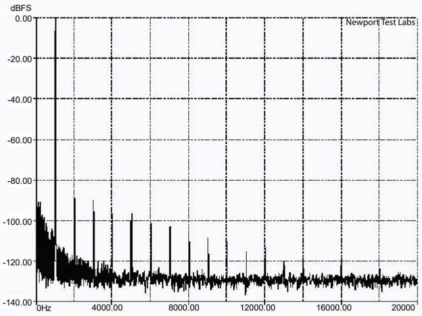
*Newport Test Labs* first measured the power output of 'Channel 1' into an eight-ohm load at three different frequencies — 20Hz, 1kHz and 20kHz — and, as you can see from the tabulated results and bar graph, the Adcom GFA-5705 returned a result of 325 watts (25.1dBW) at each of the three test frequencies. This is not only a very high power output but also considerably higher than Adcom's specification of 200 watts.

The test lab then repeated the same test but this time drove both Channel 1 and 2 simultaneously, and you can see that the Adcom delivered an identical result — the exact same output at all three test frequencies.

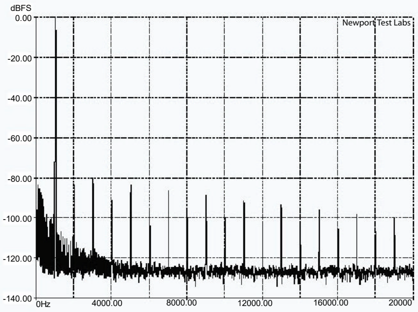
When we reduced the test load resistance to four ohms, the GFA-5705 delivered the same power levels no matter whether a single channel was being driven or two simultaneously, although this time the output was not the same irrespective of the test frequency. Instead, power topped out at 529 watts at 1kHz, decreased to 506 watts at 20kHz, and decreased further to 484 watts at 20Hz. Despite these decreases, the lowest result is still far higher than Adcom's claimed 300-watt output when the GFA-5705 drives a four-ohm load.

The level matching between the two channels on test was excellent, with *Newport Test Labs* measuring just a 0.071dB difference in level. The separation between these channels was also extraordinarily good, being 101dB across almost the entire audio spectrum, diminishing to 92dB only at the very highest frequencies.

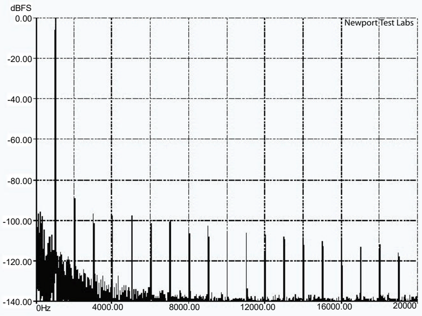
Graph 1 shows the THD+N measured by *Newport Test Labs* when the GFA-5705 drove a single channel into an eight-ohm load at a one-watt output. The test signal (referenced to 0dB) is the peak towards the left of the graph. You can see that the second and third harmonic distortion components (at 2kHz and 3kHz respectively) are both approximately 90dB down, equivalent to a distortion percentage of 0.0031%. The fourth and fifth harmonic components sit down at around –98dB, or 0.0012%. The sixth (and higher) harmonic distortion components are more than 100dB down, or 0.001%. You can see that the noise floor is very low across most of the audio band, at around –130dB, and although it increases at low frequencies (presumably primarily caused by power supply hum components), it is still more than 90dB down.



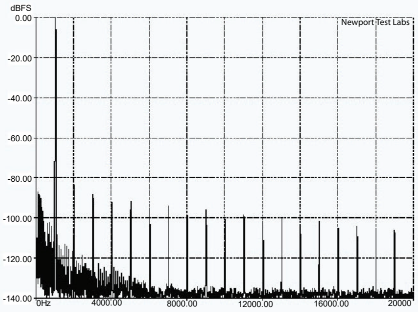

**Graph 1.** THD @ one watt @ 1kHz into an eight-ohm resistive load.



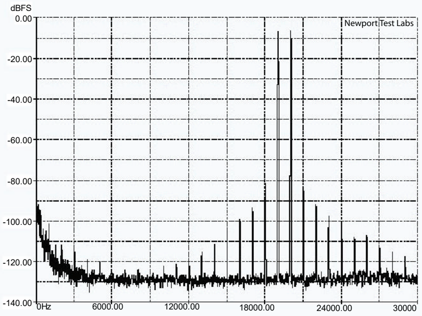

**Graph 2.** THD @ one watt @ 1kHz into a four-ohm resistive load.



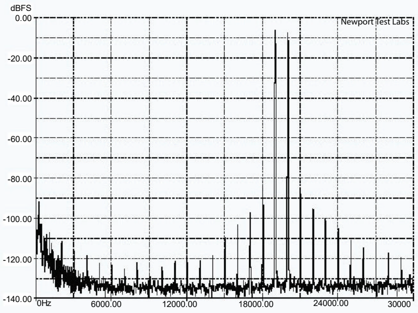

**Graph 3.** THD @ 20 watts @ 1kHz into an eight-ohm resistive load.



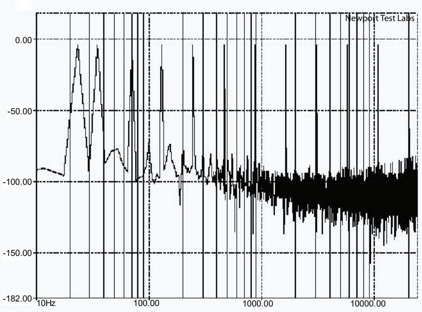

**Graph 4.** THD @ 20 watts @ 1kHz into a four-ohm resistive load.



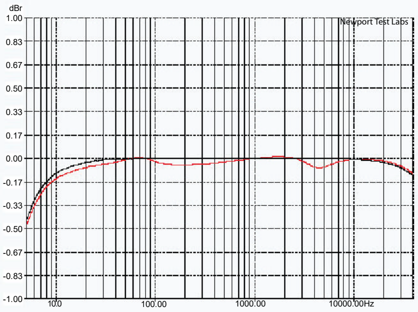

**Graph 5.** IMD (CCIF - 19kHz and 20kHz 1:1) @ a one-watt into eight-ohm resistive load.




**Graph 6.** IMD (CCIF - 19kHz and 20kHz 1:1) @ a 20-watt into eight-ohm resistive load.




**Graph 7.** Multi-tone response @ a one-watt into eight-ohm resistive load.




**Graph 8.** Frequency response at a one-watt into eight-ohm resistive load (black trace), and into a simulated loudspeaker load (red trace).

Graph 2 shows the results of an identical test, except that the load resistance across the GFA-5705's output terminals was reduced to four ohms. You can see that the performance into this lower resistance is not up to the same high standard as when the amplifier is driving an eight-ohm load. The levels of the individual harmonic distortion components have climbed, and the odd-order harmonics (third, fifth, seventh, and so forth) are all around 10dB higher in level than the even-order distortion components. That said, the highest of these distortion components is the third, sitting 80dB down, which is still only 0.01% distortion and, with a few exceptions

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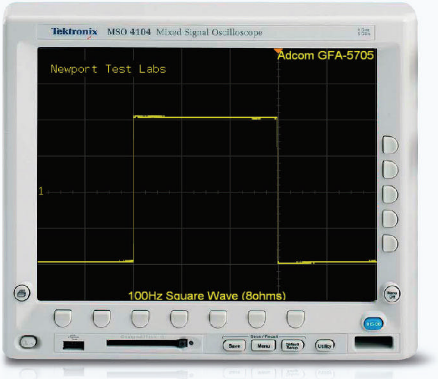
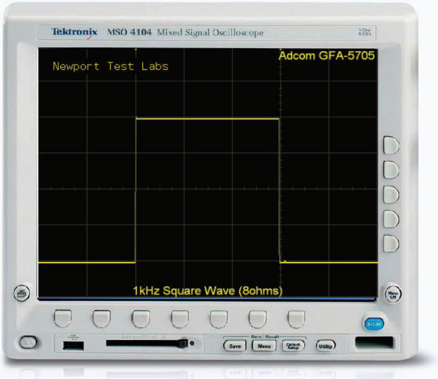
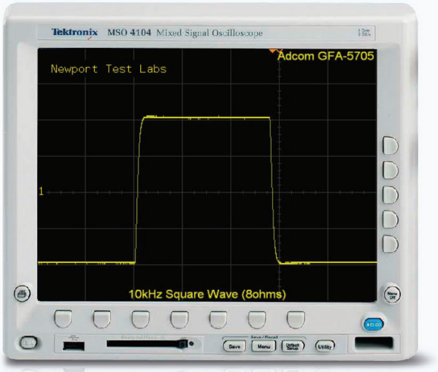
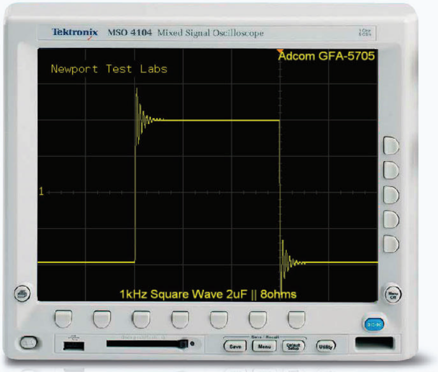



(the second, fifth, seventh and ninth) all other distortion components are more than 90dB down, or 0.0031%. Noise levels are also slightly higher across the audio spectrum, including at low frequencies.

The output spectrum measured by the lab when power was increased to 20 watts into an eight-ohm load is shown in Graph 3. You can see that although the number of harmonic distortion components increases, the level of the second still sits at approximately –90dB (0.0031% HD), and aside from the third, fourth and fifth harmonics, which sit a little higher than –100dB (0.001%), the higher-order components are more than 100dB down. Noise levels are lower (because of the higher 0dB reference) — mostly close to 140dB down at higher frequencies, and close to 100dB down at low frequencies.

When we decreased the test load to four ohms (Graph 4), overall distortion increased in the same way it did during the one-watt distortion testing, while noise levels were again higher with the lower-resistance load. Interestingly, the differences in levels between the odd-order and even-order harmonics are not as significant as they were at the lower power output.

*Newport Test Labs* measured intermodulation distortion (IMD) using the European CCIF twin-tone technique rather than the US SMPTE method, and the results are shown for power output levels of one watt (Graph 5) and 20 watts (Graph 6), both measured using a standard eight-ohm test load. These tests show that IMD remains essentially unchanged across the two output levels and that they are generally low. There is an unwanted difference signal down at 1kHz along with some associated harmonic distortion components, though that 1kHz signal is more than 100dB down (0.001%) and therefore insignificantly small.

The Adcom exhibited a very flat and extended frequency response, with *Newport Test Labs'* measurements being within 0.5dB from less than 1Hz right out to 120kHz, and with –3dB points at less than 1Hz and at 210kHz. These results far exceed Adcom's specifications. Graph 8 shows the GFA-5705's frequency response across the audio band: the black trace represents its performance when it's driving a standard laboratory test load. You can see that it's superbly flat — only 0.09dB down at 10Hz and 40kHz, and even flatter between 20Hz and 20kHz, essentially better than ±0.01dB.

Frequency response into a load that simulates the one a real loudspeaker would present was almost as good as what the GFA-5705 delivered into a resistor, as you can see from the red trace on Graph 8. The primary difference is the linearity across the audio band, but, normalised, the frequency response measured by *Newport Test Labs* is still 20Hz – 20kHz ±0.04dB, which is both superb and also far better than Adcom's specification. For the record, the simulated speaker load circuit used by the lab here duplicates the load a two-way, bass-reflex loudspeaker would present to the amplifier, and is the same one used by *Stereophile* magazine. John Atkinson created it based on a circuit developed by Ken Kantor of NAD, AR, NHT, and Tymphany *et al* fame.

*Newport Test Labs* measured the signal-to-noise ratio of the GFA-5705 (referenced to its rated power output) as 107dB A-weighted, which is 1dB better than Adcom's specification of 106dB. That said, we have to say that for a high-powered power amplifier, a specification

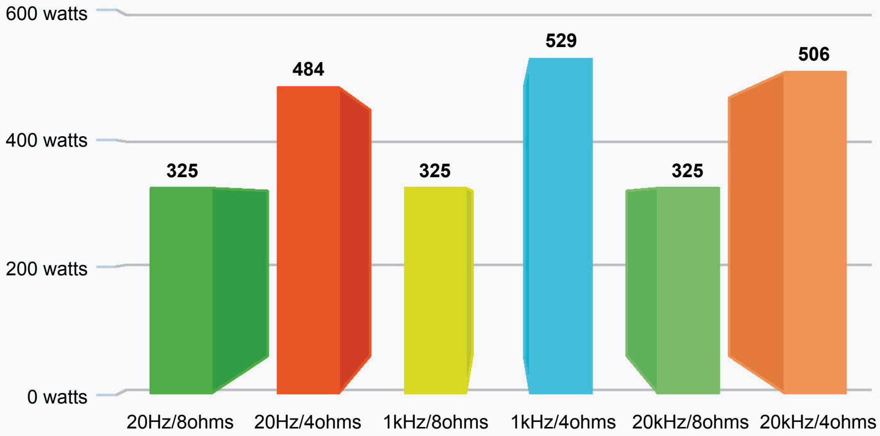
## Adcom GFA-5705 Multi-channel Power Amp – Power Output (2CH)

| Channel | Load (Ω) | 20Hz (watts) | 20Hz (dBW) | 1kHz (watts) | 1kHz (dBW) | 20kHz (watts) | 20kHz (dBW) |
|---|---|---|---|---|---|---|---|
| 1 | 8 Ω | 325 | 25.1 | 325 | 25.1 | 325 | 25.1 |
| 2 | 8 Ω | 325 | 25.1 | 325 | 25.1 | 325 | 25.1 |
| 1 | 4 Ω | 484 | 26.8 | 529 | 27.2 | 506 | 27.0 |
| 2 | 4 Ω | 484 | 26.8 | 529 | 27.2 | 506 | 27.0 |

**Note:** Figures in the dBW column represent output level in decibels referred to a one-watt output.

## Adcom GFA-5705 Multi-channel Power Amplifier – Laboratory Test

| Test | Measured Result | Units/Comment |
|---|---|---|
| Frequency Response @ 1 watt o/p | <1Hz – 120kHz | –1dB |
| Frequency Response @ 1 watt o/p | <1Hz – 210kHz | –3dB |
| Channel Separation (dB) | 101dB / 101dB / 92dB | (20Hz / 1kHz / 20kHz) |
| Channel Balance | 0.071 | dB @ 1kHz |
| Interchannel Phase | 0.02 / 0.04 / 1.42 | degrees ( 20Hz / 1kHz / 20kHz) |
| THD+N | 0.019% / 0.001% | @ 1 watt / 20 watts |
| Signal-to-Noise (unwghted/wghted) | 78dB / 84dB | dB referred to 1-watt output |
| Signal-to-Noise (unwghted/wghted) | 91dB / 97dB | dB referred to 20-watt output |
| Signal-to-Noise (unwghted/wghted) | 101dB / 107dB | dB referred to rated output |
| Input Sensitivity | 59mV / 264mV | (1-watt / rated output) |
| Output Impedance | 0.03Ω | at 1kHz |
| Damping Factor | 266 | @1kHz |
| Power Consumption | 1.3 / 125 | watts (Standby / On) |
| Power Factor | +0.621 | |
| Mains Voltage Variation during Test | 238 – 249 | Minimum – Maximum |




The Adcom GFA-5705's per-channel output

of 106dB A-weighted is rather a low bar. That is even more obvious when you look at the S/N result when the noise is referenced to a one-watt output, as under this more stringent test condition the ratios were measured as 78dB unweighted and 84dB A-weighted.

Output impedance was 0.03 ohms at 1kHz, for a damping factor (DF) of 266, which is close enough to Adcom's specification to make no difference, given that this is a pretty tricky measurement to take. The result is also so high that it's of academic interest only, since a damping factor as low as 60 is more than sufficient to ensure an amplifier has total control over the back-emf from any bass driver. Indeed, the GFA-5705 beats this by a mile.

The lab's power consumption measurement shows that the GFA-5705 in 'Standby' mode does not meet the Australian government's recommended standby consumption target of 0.5 watts, though a 1.3-watt standby consumption is hardly going to put a blip in your electricity bill. The 125-watt standing power consumption measurement does, however, mean that you should use the Adcom's standby mode whenever you aren't listening to it!

The square wave measurements performed by *Newport Test Labs* visually confirm its measurements of the GFA-5705's frequency response. The 100Hz oscillogram looks very close to perfect, with the lack of tilt indicating that the frequency response extends almost to DC, and the lack of bending of the wave's horizontal part indicating almost no phase shift. You should ignore the bits of 'fuzz' visible on the waveform as it is an artefact introduced by the storage function of the digital oscilloscope.

The 1kHz square wave reproduced by the GFA-5705 is perfect — results for this test don't get better than this! The same is true of the 10kHz square wave, which shows only the very slightest slope on the leading edge, indicating a very fast rise time — so fast that we'd happily go along with Adcom's specification of 2.3μS. The fourth oscillogram, which shows the Adcom's performance when it's producing a 1kHz square wave into a highly reactive load (a 2μF capacitor in parallel with an eight-ohm resistor) shows that the amplifier will be unconditionally stable into any loudspeaker, including electrostatic designs.

The Adcom GFA-5705 performed brilliantly well across all the tests performed by *Newport Test Labs*. Excellent performance!

***Steve Holding***

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- Outrigger feet design

RRP **$16,000**

I love that this Lithuanian loudspeaker manufacturer has named a complete series of loudspeakers after a scheming Spanish barber who appears as a character in eighteenth-century French plays as well as famous operas by Mozart (The Marriage of Figaro) and Rossini (The Barber of Seville), though I would have preferred it recognise its own national heritage, not least because Lithuanian is the oldest language in Europe — older than Celtic, German and Greek and certainly far older than French or Italian. Still, I suppose that Audio Solutions' founder and lead design engineer Gediminas Gaidelis had his reasons.

The model reviewed here, the Figaro M2, sits almost in the middle of an eight-model range that includes a centre channel (Figaro C2). Three models — the S2, M2 and L2 — not only look identical but also sport the same driver count, driver layout, tweeter and cabinet design. Their differences lie in cabinet size and that the smaller Figaro S2 use 152mm drivers for the midrange and bass, whereas the larger Figaro L2 pair a 183mm midrange with two 233mm bass drivers.

The original Figaro speakers were released six years ago, and it was only last year, at the 2023 Munich High End Show, that this new 'M2' version launched. The Figaro M2 are so different from their predecessors that I was a bit surprised Audio Solutions didn't see fit to create a new range. You may also share my surprise when you discover further in this in-depth review the full extent of what is so different about it.

### THE EQUIPMENT

Each Figaro M2 has twin bass drivers, just like the originals, but whereas the earlier model used two repurposed mid/bass drivers to deliver the lower frequencies, the newcomer uses dedicated bass drivers specifically designed to deliver low frequencies, not low and midrange frequencies. The sonic upshot, according to Gaidelis, is that the M2's bass reproduction is 'more precise and articulate'. As with the first-gen Figaro, the cone drivers here are not made in Lithuania by Audio Solutions but by SB Acoustics, a division of Malaysian company Sinar Baja Electric which is managed by former Scanspeak/Tymphany employees Ulrik Schmidt and Frank Neilsen.

With the bass driver's diameter rated as 183mm, my tape measure put their moving diameter at 145mm, their Thiele/Small diameter at 132mm, and the cone diameter at 124mm, for an Sd (effective cone area) of 140cm². Interestingly, the cone is fitted with an enormous dustcap around 77mm in diameter. The cone is made of paper (but a special type, as I will discuss in a moment) and the chassis from diecast alloy.

These drivers operate in parallel, meaning the Figaro M2 has not only a fairly low overall impedance (Audio Solutions says it is 'nominally four ohms') but also a very low minimum impedance. (Independent test lab *Newport Test Labs* measured the minimum impedance as 2.6 ohms). However, using two drivers to deliver bass increases the design's efficiency, enables a higher power-handling capability (because amplifier power is distributed over two voice coils, rather than just one) and, most importantly, means that more air can be moved, improving the realism of the bass sounds.

> 'Our team works with architects and designers... to make a one-of-one product for your living room'

Like their predecessor, the new Figaro M2 are also true three-way designs, by virtue of having a single 152mm cone driver dedicated to midrange frequencies (from around 400Hz up to 4kHz, as these are the crossover points, about which more later). Despite having a rated diameter of 152mm, this driver has a cone diameter of 100mm, 42mm of which is covered by a dustcap. The total moving diameter (cone plus roll surround) is 118mm.

Indeed, a dedicated midrange driver is essential if you wish to avoid phase modulation distortion across the mid-band. This distortion occurs whenever a single speaker cone is called upon to reproduce both low and high frequencies simultaneously, and so happens in any design where the bass driver(s) are also required to deliver the midrange — in other words, in any two-way loudspeaker.

Why? Because if a driver is required to produce a single low-frequency sound (at, let's say, 55Hz), its cone will move backwards and forwards fifty-five times per second, and your ear will hear the resulting movement of air caused by this movement as the musical note 'A1'. However, if that same driver also must produce a midrange note such as, say, 'middle-C', which has a frequency of 261.63Hz, it would also have to move backwards and forwards 261.63 times per second at the very same time it is also moving backwards and forwards 55 times per second! Consequently, the frequency of what should be 'middle-C' will not always be precisely 261.63Hz; it will be shifted higher or lower depending on the direction the cone is moving to produce the 55Hz signal. Because of phase modulation distortion, it's preferable that bass drivers produce only low-frequency frequencies, and a completely separate loudspeaker to produce midrange ones. (For a more detailed explanation and real-life speaker measurements, read the article '*Doppler distortion in loudspeakers – Real or Imaginary?*' at https://sound-au.com/doppler.htm.)

There is yet another advantage to using a dedicated midrange driver: you don't experience the differences in tone, phase and spatial position when the audio signal switches from one driver to another, which is inevitable in any two-way system, particularly since the human ear is critically sensitive in this mid-band region as a direct result of evolution. Gaidelis explains it this way: 'In nature, the sounds of life-threatening events lie more or less in 1,000–2,000Hz diapason, so naturally, we are most sensitive to that so we could stay alert. The downside of this phenomenon in this rather safe modern world is that we can hear and pinpoint the slightest imperfections in reproduced sound at those frequencies, yet... most manufacturers calculate crossover points in exactly this area. The only way to fight this is to utilise crossover points away from this region, and it is for this reason we created an Extended Band Midrange driver whose crossover points of 400Hz and 4,000Hz are one octave away from the sensitive band.

## Bass performance is excellent whether they are positioned close to a rear wall or away from one

This solution not only helps with crossover distortion perception but means also that the listener gets uniform, unchopped sound coming from one driver with virtually zero phase shift. Homogenous sound in my opinion is one of the biggest goals in the audio industry.'

So, back to these paper cones. The Figaro M2's midrange and bass driver cones are made of a paper pulp that is 'extra rigid', hence the designation 'ER paper cones'. Gaidelis chose them for their ability to deliver the uniform piston motion of a cone made from a hard material (metal, ceramic etc), without suffering from the drawbacks of such materials such as early break-up modes and ringing. 'Having the positive properties of paper and introducing hardening materials like sturdy fibres and hard pulp gives us a unique cone that acts as a piston, but at the same time does not have ringing or early cone break-up points,' he says. 'ER cones allowed us to introduce new piston-like bass drivers and of course our extended band midrange.'

One drawback of the ER cone, however, is that its surface seems to be imperfect to the naked eye, due to the visible presence of hard pulp flakes and fibres, as well as the colour variances between different parts of the cone that make it look as though its surface has suffered water damage. These seeming imperfections are, says Gaidelis, 'natural to rigid ER paper cones as a result of the hard pulp being less processed and is the same for all drivers using hard pulp, including those from SEAS, SB Acoustics, Scan-Speak and Vifa'.

Made by Tymphany, the Figaro M2's tweeter has a soft fabric dome 19mm in diameter, and is fitted to the bottom of a shallow plastic horn to reduce the distortion that occurs at higher volume levels when the mass of air in front of the dome's peak becomes sufficient enough to prevent it from moving as fast as the dome's sides. This problem is solved in various ways by different manufacturers. A common one is to attach the dome's peak to a 'bridge' spanning the tweeter, another is to simply damp the peak using a similar bridge method. Gaidelis uses a 'mini-horn' solution, which he says achieves the same result at a lower cost, while an added advantage is that the horn-loading increases the tweeter's efficiency so that it doesn't have to work as hard to produce the same sound pressure levels as it would without it.

Unlike many tweeters, this one does not have any ferrofluid in the voice coil gap as, according to Gaidelis, it 'slows the tweeter down'. The engineer says he also put the crossover frequency between the midrange driver and the tweeter at 4kHz, which is higher than usual, to 'keep all crossover components outside the range where our ears are most sensitive.'

The crossover network itself has also been improved over the one in the original Figaro, with several of the components having been 'improved in quality to gain a bit more precision in sound, mostly in the tweeter (sic) and midrange', and small corrections having been made in the values of those components in order to 'further improve signal separation into three ways'.

The most significant of the changes brought by the Figaro M2, according to Gaidelis, is the cabinet. It's completely different, using the same technology he developed for the Audio Solutions Virtuoso, which he calls a 'box-in-a-box system' and says is superior to the M1's self-locking cabinet system. Essentially, the new cabinet comprises two 'boxes' (cabinets), one inside the other. Of this design, Gaidelis says: 'The weakest points of a traditional speaker cabinet are the corner joints since they behave

more like hinges, rather than tight joints in a natural vibrating environment. The 'box in a box' approach resolves this issue by combining two cabinets, arranged in an offset pattern. The internal cabinet is fully sealed and outfitted with heavy internal bracing and dampening. It is then covered with an outer box, which is glued tightly to the internal cabinet. This technique allows the cabinet to achieve ten times the stiffness of a single-layer enclosure. The sonic gains from the stiffer cabinet are enormous — the sound is neutral and more authentic and, as a part of this arrangement, the cabinet also becomes heavier, which directly helps with vibrations control.'

Audio Solutions' website refers to it as a 'Cabinet-in-a-Cabinet' enclosure design that comprises 'two separate enclosures — an inner cabinet and an outer cabinet bonded together by a thin layer of polyurethane. The inner cabinet is manufactured of a lightweight yet rigid material that controls primary vibrations by absorbing acoustical power coming from the drivers. Then a thin layer of viscous polyurethane situated in between the inner and outer cabinets acts as a dampening layer which converts vibrations born in the inner cabinet to heat. The residue of vibrations is then dampened by the outer cabinet which is manufactured of a much heavier and less dense material that acts as a mass damper.'

Externally, the cabinet is available ex-stock with three different finishes — Standard, Premium and Bespoke. 'Standard' offers the cabinet's front section in one of four glossy paint colours, but the rear section is simply painted black, as is the script ('Audio Solutions' and 'Figaro') on the front panel; 'Premium' sees the entire cabinet painted in one of the available glossy colours, with a black stripe down each side; and 'Bespoke' is the newest (and priciest) option, offering satin paint colour finishes with brass side stripes and lettering.

That said, should you prefer a unique, 'non-stock' finish, Audio Solutions offers what it calls its 'Exclusive Personalisation Program', where you can tailor the colours and/or style to your taste. 'We can do small changes (or) we can make completely tailor-made speakers,' says the company. 'Our team works in conjunction with architects and designers and is ready to make a one-of-one product for your living room.'

This Figaro sequel also has an outrigger arrangement for the feet to increase the stability of the rather tall (1108mm) cabinet. The two outriggers and four conical feet come in a separate plywood box – indeed, they're rather better packed than the speakers themselves, which come in relatively flimsy cardboard cartons! The outriggers are made of 12mm-thick wood, rounded at either end and painted black, with the rear one longer than the front one – 335mm vs 393mm. Their construction seems relatively flimsy, despite the addition of wooden 'pucks' atop each outrigger above the cones, so I wouldn't recommend 'walking' these very heavy (45kg!) loudspeakers on them during the positioning process.

Once the speakers are in place, then, the outriggers need to be slotted into pre-machined troughs in the base of each cabinet, after which each one is fixed in place using three Philips head screws. On my review sample, the troughs were not quite as deep as the wood is thick, so there was a little 'lip' where each outrigger stood proud of the base. I would prefer the surfaces to finish flush, but since this is all underneath the speaker and therefore invisible, it's hardly an issue. Gaidelis says the new arrangement is 'more stylish, practical and a lot more stable'.

Another change: the grille type. Magnetic grilles replace the old 'double grille' system, but I have to say the design is rather curious. Rather than being a frame, like most speaker grilles, this one is made from a solid piece of 6mm-thick timber that has holes only where the drivers are located. The holes, at that, are rather small — 145mm in diameter for the single midrange and two bass drivers (mirroring their moving diameter), and only 60mm in diameter for the tweeter. I therefore suspected that the Figaro M2's off-axis performance could be affected by the grilles, particularly in the higher frequencies.

As you've undoubtedly already gathered, the bass reflex port — actually, ports; there are two — are located at the cabinet's rear. Each is 50mm in diameter, 140mm long, made entirely of smooth black plastic and flared at only the exit (not at the entrance). The ports sit immediately above the speaker terminals, which are the excellent WBT NextGen design, with plastic threads and a separate collar that enables the knurled nuts to be easily tightened down onto bare wire, collars, spades, or whatever you use to terminate your

speaker cables. The terminals themselves are fixed to a brass plate.

## LISTENING SESSIONS

Given my curiosity over the grilles' odd design, I decided to trial it before starting my listening sessions in earnest. Although, admittedly, that decision may have been affected by a preconceived assumption, I found I preferred the Figaro M2's sound without their grilles fitted — though only the very highest frequencies sounded different to me, and only by a small amount. As it happened, I also preferred the look of the speakers without the grilles, so if I owned a pair, the grilles would likely stay packed away in their little boxes.

Whilst evaluating the off-axis issue, I also discovered I preferred the cabinets slightly angled so that the tweeters aimed directly at the listening position, though again, the differences between that and them aiming straight up the listening room were small — more negligible than the grille on/off differences — so this would be a personal call. The great news is that the Figaro M2's bass performance is excellent whether they are positioned close to a rear wall or away from one, so much so that, despite the presence of the rear-firing ports, I was happy with the bass delivery even when the speaker cabinets' bases were flush against the skirting board — a trait that will no doubt ensure these speakers have a very high partner acceptance factor!

I will elaborate further by adding that bass not only sounds great but is also very extended, easily digging deeply into the bottom-most musical octave where only the lowest-pitched instruments can reach, such as the keyboard instruments, the double bass and the kick drum. Listening to one of my favourite albums from across the ditch, Lorde's cleverly titled debut 'Pure Heroine' from 2013, which is replete with great-sounding deep bass lines, was a revelation; I don't think I've ever heard it sound so good. Right from the opening track, *Tennis Court*, I could not only hear the deep bass but feel it as well (admittedly I had the volume up pretty high!). This track also features spectacularly good percussion sounds, all of which were reproduced crisply and precisely by the Figaro M2. It also has several stereophonic shenanigans going on, where sounds pan and alternate between the channels, and these too were splendidly communicated in front of me.

The second track, *400 Lux*, also demonstrated the speakers' ability to deliver the very deepest bass notes, and not just when the volume levels were set to 'stun' (I had backed off the volume out of consideration for my neighbours). But both these tracks are really just warm-ups for the third track, *Royales*, which is an absolutely perfect piece of song-craft; so perfect that the list of music critics who called it the best song of its release year is a lot longer than your arm. And of course, it has since been covered by the likes of Bruce Springsteen and others, has featured in advertisements (Samsung) and was the first song Lorde permitted for use in a movie (Hustlers). Listen to the lyrics and you will be amazed to learn that Lorde reportedly wrote it in just under 30 minutes! The track's sparse (mostly electronic) instrumentation allowed me to admire not only Lorde's mezzo-soprano vocals but also the Figaro M2's talents to deliver them with such purity and accuracy, despite the mezzo vocal range spanning F#3 (185Hz) to F#5 (739Hz) and therefore meaning that both the midrange and the bass drivers were involved in the rendition.

I was also able to admire the tonal consistency of the left and right speakers thanks to backing vocals being allocated individually to each channel, as well as their imaging courtesy of Lorde's vocal being exactly stage-centred. You'll also hear this soundstaging prowess on the a capella introduction to *Team*, the sixth track on the album. Ultimately, I rate the Figaro M2's stereo imaging abilities as second to none.

Switching from fairly sparse sonics to rock 'n' roll (albeit sticking with my 'across the ditch' theme), I fired up the fabulous 'True Colours' album by Split Enz (Kiwi musos seem to have a trick of inventing clever titles!). Anyone who is familiar with the record will sympathise with me skipping opener *Shark Attack* in favour of kicking off with the far superior *I Got You*. This track proved instantly that the Figaro M2 deliver the sounds of real instruments just as well as synthesised ones, and that they excel in delivering the fuller sound of a straight-ahead rock band. All the drum and cymbal sounds in Malcolm Green's kit were delivered wonderfully, as were the inventive bass lines from Nigel Griggs' bass. The distinctive vocals of the two Finns were also very well reproduced, but among the standouts was how the Figaro M2 revealed the unique sound of Eddie Raynor's CP-70 electric piano.

The electric piano inspired me to spin an album with a real one, so up next was Jean-Efflam Bavouzet's release from a year or two ago, Haydn Piano Sonatas, Vol 11, on Chandos (CHAN20193). The first work on this album reminded me of my own youthful rendition of it when I was learning to play the piano. With the benefit of age, hindsight and the obvious perfection of Jean-Efflam's performance, I can see why my teacher winced at my rendition of Haydn's Piano Sonata No. 1 in G major! I digress…

The Figaro M2 had no difficulty reproducing the majestic sound of Bavouzet's grand with superb realism, revealing the sonorities of the piano and his finger-touches perfectly. And if a loudspeaker can do these things, it can do anything! From there it was just a short step to my series of auditions using a variety of orchestral works, and who better to start with than Gustav Mahler? Particularly since a superb new recording of his first symphony performed by the Czech Symphony Orchestra, under the baton of Semyon Bychkov, is now available. It's a lovely performance, one where Bychkov goes back to simplicity, eschewing the curious interpretations and instrumentations that have adversely affected so many other performances (over-abundances of double-basses, for one), and the Figaro M2 delivered the orchestra excellently. They reprised their performance, too, when I followed up with Mahler's Symphony No. 3 (Bernstein, with the New York Philharmonic) and No. 5 (Bernstein again, but with the Vienna Philharmonic). And no, you can never listen to too much Mahler, so I also listened to his best symphony, No. 9, as played by the Berlin Philharmonic Orchestra under the great Herbert von Karajan. Each time, the Audio Solutions Figaro M2 came up trumps!

## CONCLUSION

The 'Figaro' name seems a fitting choice, the word having come to represent someone who is cunning and dexterous. The Figaro M2 certainly are artful and highly skillful. They have a peaceful and easygoing nature, always sounding elegantly smooth and superbly natural, and deliver music in a relaxed yet utterly involving manner irrespective of the music genre played. These are truly wonderful-sounding — and, particularly in their Bespoke finish incarnation, wonderful-looking! — loudspeakers. They have my very highest recommendation. ***Greg Borrowman***

### TECH SPECS & CONTACT

**Brand:** Audio Solutions
**Model:** Figaro M2
**RRP:** $16,000 per pair
**Warranty:** Five years
**Design:** Three-way, ported
**Drivers:** 19mm silk dome tweeter; 15.2cm ER paper cone midrange, 2 x 18.3cm ER paper cone bass drivers
**Frequency response:** 30-25000Hz
**Suggested amp power:** 10-300W
**Crossover:** 400Hz; 4000Hz
**Sensitivity:** 91.5 dB @ 2.83V 1m
**Nominal Impedance:** 4 ohms
**Dimensions (hwd):** 111cm x 27cm x 47cm
**Weight:** 45kg

**Distributor:** Absolute Hi End
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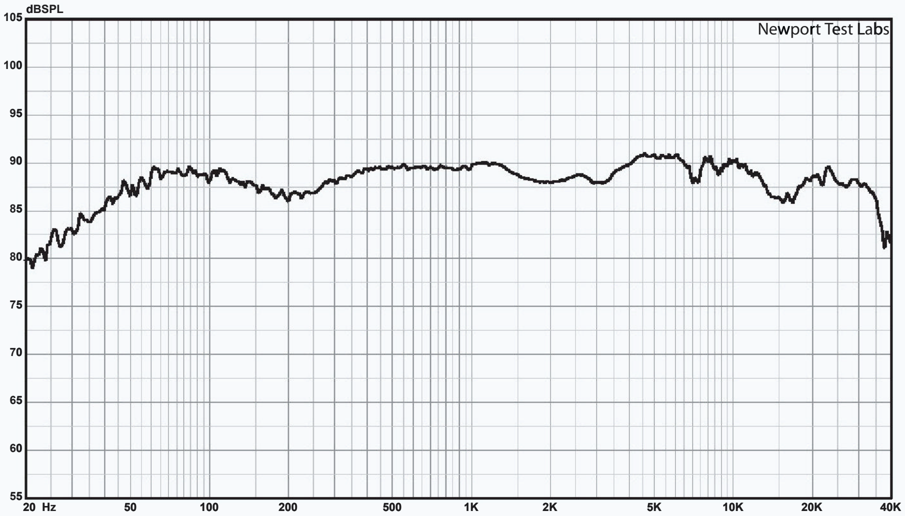
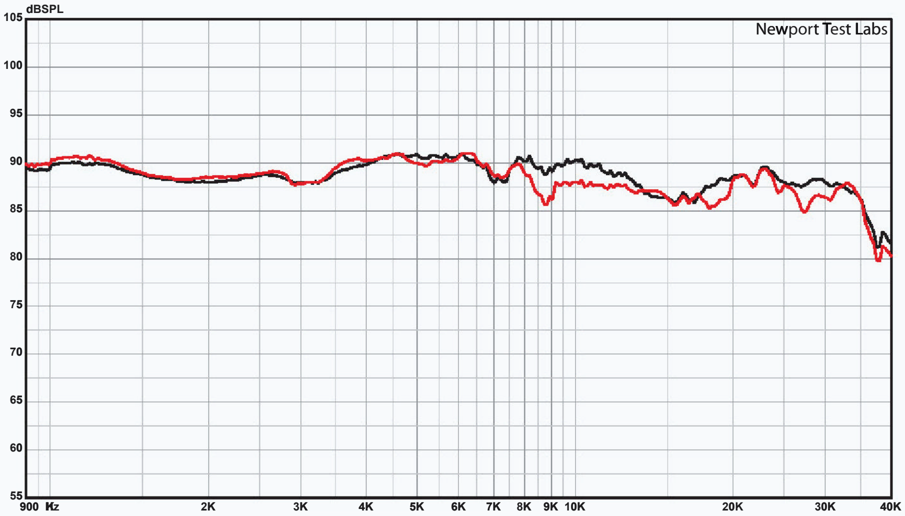
Ormond VIC 3204
**T:** 0488 77 7 999
**E:** info@absolutehiend.com
**W:** www.absolutehiend.com

# Laboratory Test Report

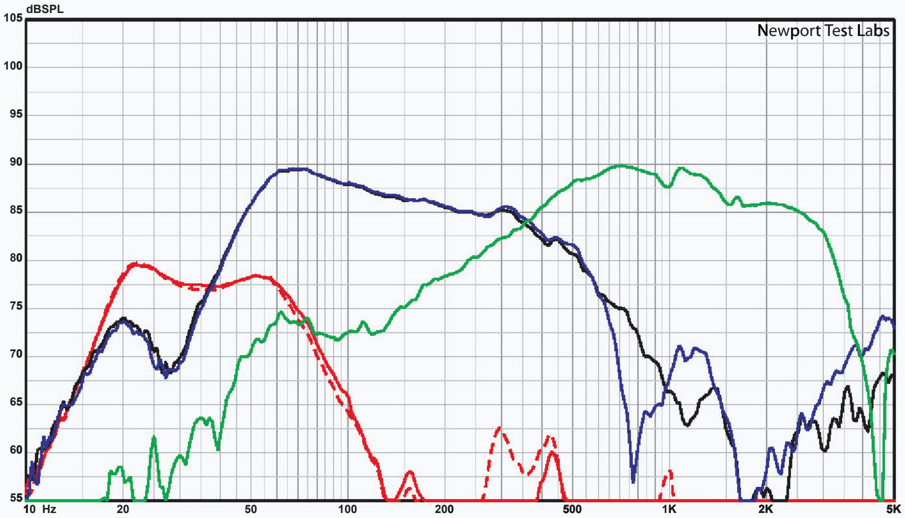
Readers interested in a full technical appraisal of the performance of the Audio Solutions Figaro M2 loudspeakers should continue on and read the LABORATORY REPORT published on the following pages. Readers should note that the results mentioned in the report, tabulated in performance charts and/or displayed using graphs and/or photographs should be construed as applying only to the specific sample tested.




**Graph 1.** Frequency response at 1 metre, on tweeter axis.




**Graph 2.** High-frequency response at 1 metre, on tweeter axis; grille off (black trace) vs grille on (red trace).




**Graph 3.** Low-frequency response, near-field measurement.

Graph 1 shows the frequency response of the Audio Solutions Figaro M2 as measured by *Newport Test Labs*. The section of the trace below 1kHz was measured in-room using pink noise, with the trace representing the average of nine measurements taken in a grid with its central point on-axis with the tweeter. The trace above 1kHz is a single measurement made one metre on-axis from the tweeter, using a gating technique that replicates the response that would be obtained if the speaker had been measured in an anechoic chamber.

You can see that the trace in Graph 1 is very linear, extending from 36Hz to 35kHz ±3dB. This is a truly excellent response. Note, too, that there is no 'skew' to the trace, showing that the bass/midrange/treble balance is ideal. The superb low-frequency extension means there is no artificial boost at around 100Hz, and that slight dip visible on the trace centred at 200Hz is likely some floor-bounce effect. You can also see that the all-important midrange response essentially lies within a 2.5dB envelope from around 250Hz to 13kHz, which is ±1.25dB. The suck-out in the tweeter's response at 7kHz would not be audible as its bandwidth is too narrow; its presence on this trace is purely due to the high resolution of the measurement technique. You can see that the tweeter's response rolls off slightly from 10kHz to 15kHz, after which it rises again and remains at reference level out to 33kHz.

The Figaro M2's high-frequency response is reprised in Graph 2, with the change in horizontal graph scaling enabling an even more comprehensive view. This time, the response with the grille in place has also been measured, shown as the red trace. You can see that the grille has almost no effect on the response below 8kHz at all, but that between 8kHz and 20kHz, it reduces output by about an average of –2dB, except for a small section around 15kHz where it again has zero effect.

Graph 3 shows the low-frequency response of the Audio Solutions loudspeaker, as measured by *Newport Test Labs* using a near-field measurement technique that replicates the response that would be derived in an anechoic chamber. The responses of the two rear-firing bass reflex ports have been measured individually; the solid red trace is the lower port's output while the dotted red trace is that of the higher port. You can see that there's significant output between 20Hz and 70Hz and that both ports operate in unison. The roll-off above 70Hz is smooth and there is very little leakage of higher frequencies through them, other than that through the upper port at around 300–450Hz.

The low-frequency response of the two bass drivers (the black and dark blue traces) extends lower than we normally see for drivers of this diameter, and the matching between the two is excellent. The dip in the response of the uppermost bass driver at 760Hz is likely caused by a cabinet resonance and is not significant, as the midrange driver (the green trace) has well and truly taken over by this stage, having been rolled on almost an octave lower. The response of the midrange driver is only approximate, particularly above 2kHz, due to inherent limitations in the

near-field measurement technique, but you can see that it essentially covers the band from 400Hz to 4kHz, as specified by Audio Solutions.

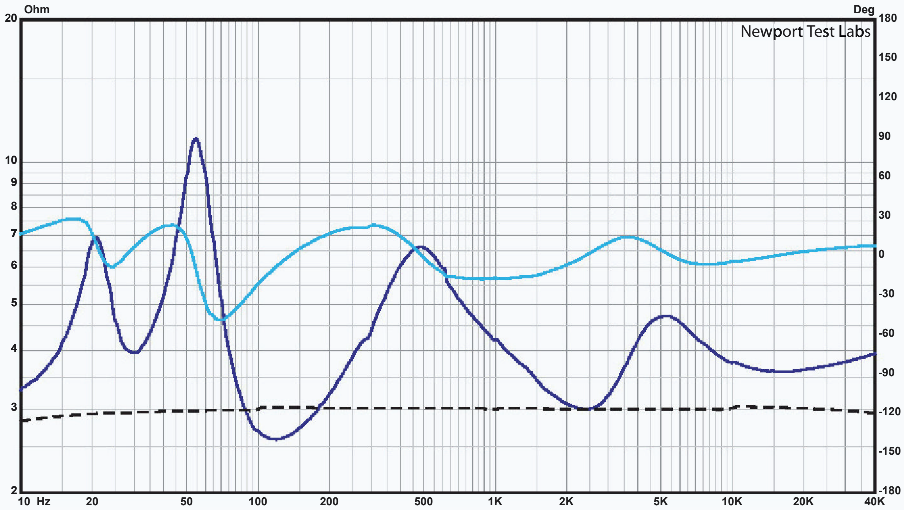
*Newport Test Labs'* measurement of the Figaro M2 shows that the company's claim of the design being 'nominally four ohms' is rather optimistic. As you can see, the impedance rises above four ohms only at the resonant peaks of the four drivers — 21Hz and 65Hz for the bass drivers, 495Hz for the midrange driver, and 5kHz for the tweeter. Furthermore, it drops below three ohms between 90Hz and 180Hz, with a minimum of around 2.6 ohms at 120Hz. The trace also shows very tiny cabinet resonances at 300Hz, 600Hz and 15kHz. (Ignore the glitches in the trace at 100Hz, 1kHz and 10kHz — they're caused by the test instrument switching from one measurement range to another at these frequencies to improve impedance measurement accuracy.)

The black dotted trace represents the measurement of a precision three-ohm resistor included to validate the accuracy of the vertical scale (it also shows that the test instrument's accuracy is not exact below 50Hz!) The 'valley' between the two bass resonant peaks shows that you can indeed expect response right down to 30Hz, as claimed by Audio Solutions. The phase angle (light blue trace) is also benign, varying less than ±30°, so other than the overall low impedance and that impedance minimum of 2.6 ohms, the Figaro M2 should be an easy load for any well-designed amplifier.

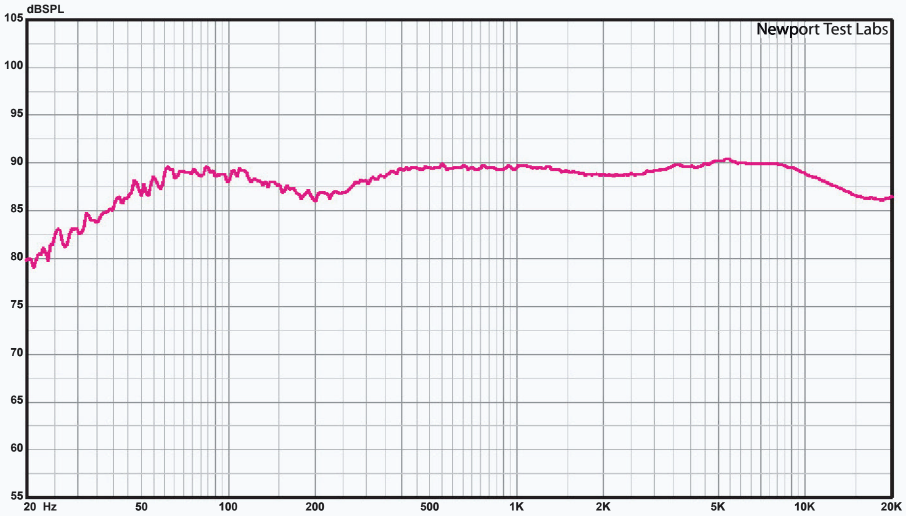
The in-room frequency response, as measured by *Newport Test Labs*, is shown in Graph 5 as the pink trace (pretty appropriate as it was measured with pink noise!). The result is the average of nine measurements made in front of the speaker. You can see that the response is superbly flat and extended, extending from 28Hz to 20kHz ±3.7dB. And note that the 20kHz parameter is simply the highest frequency that can be shown on this graph; the actual response of the Figaro M2 extends beyond 30kHz, as shown on Graphs 1 and 2. This response essentially reveals what would be perceived by the human ear. It was measured with the speaker well away from any room boundaries, so just note that bass response would be further extended if the speakers were placed closer to a rear wall.

Graph 6 is a composite plot whereby *Newport Test Labs* has overlaid the various response plots so that you can see the 'fit' between the different measurement techniques used to create the graphs. It also shows more explicitly that the in-room response at high frequencies is smoother than the anechoic high-frequency response.

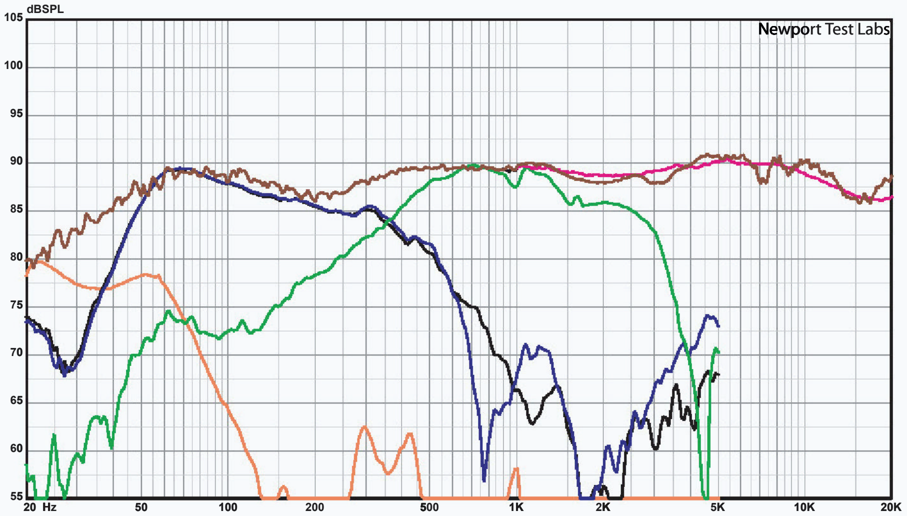
*Newport Test Labs* measured the sensitivity of the Figaro M2 design as 89.5dBSPL at one metre, using a 2.83Veq input. This result is almost 3dB higher than the average for floorstanders, making this a very efficient loudspeaker that will make maximum use of your amplifier's




**Graph 4.** Impedance vs frequency (dark blue), phase angle (light blue), reference 3-ohm calibration resistor (dashed black)




**Graph 5.** In-room frequency response, via nine averaged pink noise measurements.




**Graph 6.** Composite frequency response traces.

power output. It is, however, 2dB lower than Audio Solutions' specification of 91.5dBSPL, a discrepancy we can only ascribe to differences in the measuring technique used to establish sensitivity (efficiency).

Audio Solutions' designer, Gediminas Gaidelis, has a track record for designing loudspeakers that have extremely linear and extended frequency responses, and achieving these laudable goals without sacrificing efficiency. Indeed, the Figaro M2 continues his track record, as it passed all *Newport Test Labs'* acoustical testing assessments with flying colours.

***Steve Holding***

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FUTURE

Show Report

# Australian Hi-Fi Show 2024 show report

## Highlights from Sydney's annual audio and AV show

Not many things would have descended on Sydney in greater numbers than millimetres of rainfall on the first weekend of April (150mm over 24 hours!), but hi-fi brands were indeed one of them. After a successful inaugural event last year, the Australian Hi-Fi Show returned to the Novotel Sydney Central Hotel to give Sydneysider audiophiles the opportunity to see and hear some of the best in audio and AV from Australia and all around the world.

Brought to you by *Australian Hi-Fi*, *What Hi-Fi?* and *Sound+Image* magazines from Future Publishing, the three-day celebration of hi-fi and home cinema featured nearly 30 rooms of kit, which included an all-Aussie system costing the equivalent of five Teslas; AlsyVox ribbon speakers from Italy that delivered mind-blowing sound and got everyone talking; and even the latest Avantgarde Acoustics horn loudspeaker system weeks before its official unveiling at the High End Munich show.

If you couldn't weather the storm to get there, don't fret — the showfloor highlights can be found below, so you can at least see what sonic heaven looked like and get an idea of which demos to chase your local retailer for as the winter months arrive. And hey, there will always be next year!

### Lower Ground Floor

**Bowers & Wilkins, Classe, Denon & more (Masimo Consumer)** →

Visitors who approached the show from bottom to top would have come across a hi-fi legend very early on. Masimo Consumer's flagship demo (of several!) housed Bowers & Wilkins' 801 D4 representative of the all-singing-all-dancing 800 Diamond Signature Series. Alongside high-end Classe Delta pre and power amplification, naturally, fed by the Marantz 30n player (a Denon turntable was there to tag-team) and connected by AudioQuest, the new 801 D4 did what they do best — highly insightful, dynamically expressive, tonally-straight-down-the-middle renditions. You wouldn't have heard Leonard Cohen's vocal in *You Want It Darker* quite like that through another system had you played it in every other room at the show.

Across the corridor was another B&W speaker series with 800 Diamond-levels of fame: the

affordable — and ever-brilliant in its eighth generation — 600 Series, paired with Marantz's PM7000N streaming amp. And ensuring no visitor was left short of demos to choose from in Masimo's lower ground floor representation, Polk speakers and Denon electronics formed a likely, also accessible pairing.

## Wilson Audio, ADG Productions & Grimm Audio (Indie Hi-Fi)

If ever a queue needed to be formed over the weekend, it was for Indie Hi-Fi's single-seat demo of the Wilson Audio SabrinaX speakers, AGD Productions Andante DAC/preamp and Audion mono amps, and Grimm Audio MU1 streamer (and Roon server). Indeed, this system deserves to be heard in that central, up-close sweet spot, and sweet it did sound.

It would've been pretty bold to occupy that room for more than 15 minutes, but you could've very reasonably spent hours in the dealer's other room, which thankfully catered for a few more bodies — specifically head-fi fans, who had before them a veritable selection of personal listening gear, including Raal Requisite ribbon, Meze Audio and Dan Clark Audio headphones driven by complementary components from the likes of HoloAudio and Ferrum. Exquisite!

## Ground Floor

## Sonus faber, McIntosh, Aurender & more (Synergy)

hi-fi Show SYDNEY 2024 WINNER BEST SOUND

Sonus faber's Stradivari sequel, which saw the iconic Italian speaker make a comeback last year to celebrate the brand's 40th anniversary, made a thrilling — and, considering its 'Best Sound' win, clearly lasting — impression at the show, aptly paired with McIntosh's MC1.25KW monos, 1200 Series digital components and MT5 turntable, as Aurender's N20 streamer brought the sweet streams and REL's No.32 subwoofers jacked up the lowest end. Listeners were treated to an enthralling rendition of Meute's *You & Me*, particularly special as the techno brass brand's chorus horns came in, while the Stradivari's imaging and sub

March Audio's two-way Ukkonen AWG with an 8-inch Purifi woofer

integration were touted using Gojira's *Drum Solo*.

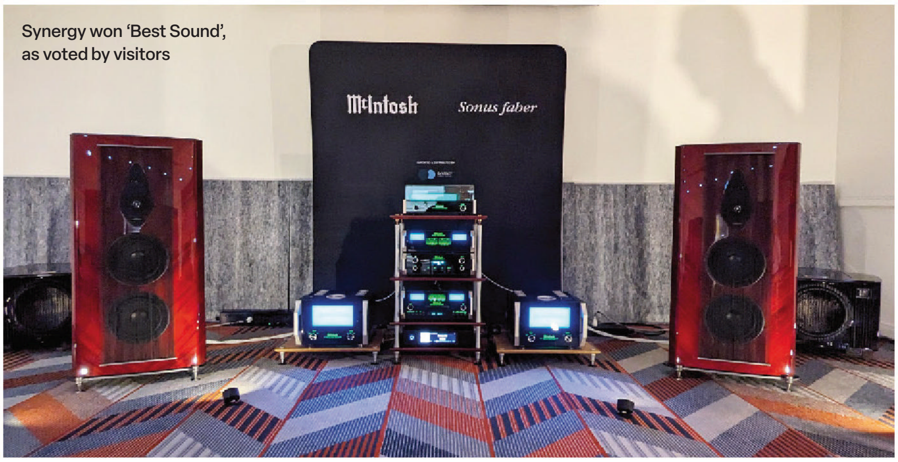
The Synergy room's more accessible, 'real-world' system saw Advance Paris — fresh from its glowing A12 Classic integrated amplifier review in *Australian Hi-Fi* — and the ever-reliable ELAC join forces, while an all-Rega system fronted by the British brand's new Aya speakers gave visitors good reason to revisit the room on their way out!

## March Audio

We were more than happy to be reacquainted with the Ukkonen AWG floorstanders by March Audio, who drove (!) their homegrown wares and themselves down to Sydney from Albany, WA to show visitors why it won second place for 'Best Sounding Room' at last year's event. With the floorstanders and its Sointuve WG standmounters driven this time by its new Pre1 preamp and flagship P801 power amp, March Audio once again demonstrated how spectacular sound doesn't have to cost the earth. And if you made the most of the 10% discount the company offered at the show, congratulations on your latest bargain!

## Vivid Audio, Jeff Rowland, PS Audio & more (Avation)

The phrase 'blue and green should never be seen without another colour in between' simply does not apply to Vivid Audio's side-by-side positioning of its Kaya S12 (green) and Giya G2, which looked gorgeous next to one another in Avation's room. The former, hooked up to a Lumin P1 streamer, the didi Jeff Rowland Capri preamplifier and PS Audio BHK M600 monoblocks, sounded as good as they looked, despite their large environment. Read (or revisit) the Kaya S12 review featured in *Australian Hi-Fi's* Jan/Feb issue for all the superlatives.



Synergy won 'Best Sound', as voted by visitors

## First Floor

## Duntech, Dohmann & Halcro (Nirvana Sound)

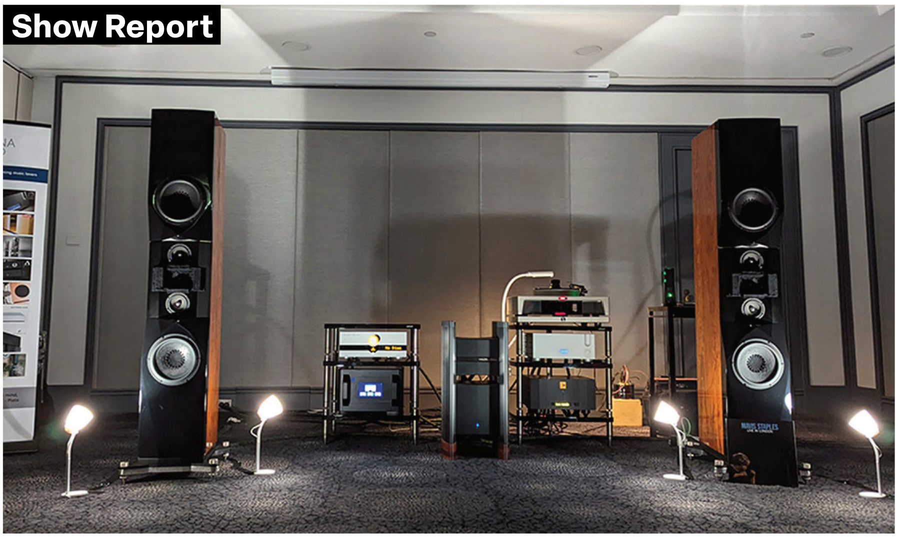
Ever wondered how your music collection would sound through a system costing the equivalent of five Teslas? The Three Aus-keteers (sorry) in Duntech, Dohmann and Halcro treated show attendees to a demo of a near-million-dollar supersystem that sounded like, well, a million dollars. Duntech's two-metre-tall Princess loudspeakers took the helm, flying the flag for the company's 'Prime Directives' design ethos, and were driven by Halcro's new stereo version of its legendary Eclipse amplifier, a review of which can be found within these very pages.

These talents were fed by another in Dohmann's equally renowned Helix One turntable, featuring a new Supatrac Blackbird tonearm whose revolutionary patented 'Sideways Uni-Pivot Arm' bearing is, if you ask us, worth further reading. Mavis Staple's 2019 'Live in London' LP was the highlight of one particular demo, with the system utterly nailing the recording's Union Chapel, London sonics.

## Elementi, BenQ & Meridian (Wavetrain Cinema)

Home cinema design company Wavetrain Cinema, who last year became the first outside Europe and North America to win 'Best Global Home Cinema' at the CEDIA Awards, offered nothing short of an audiovisual spectacle at the Australian Hi-Fi Show.

The $100,000 set-up comprised surround speakers (Firebird, Firefly), subwoofers (Obsidian) and amplification (Tungsten, Magnesium — located close to the speakers in vertical enclosures to reduce cable lengths and consequent interference) from the company's own brand Elementi. Also in action was a Severston Impression Series screen, Lumagen Radiance Pro video processor and BenQ's brand-



Duntech, Dohmann & Halcro's million-dollar system

new W5800 laser projector. And boy, was it a showstopper! 'Barbie' showed off the BenQ's rich colour palette, 'No Time To Die' reassured that it could 'do natural' while being a glossy double-page advert for Elementi sound, and the final 'The Greatest Showman' demo clip would've sealed the deal for anyone umming and ahhing over turning their nest-flown teenager's room into a dream home cinema. Fantastic!

## Avantgarde Acoustic, Piega, Innuos & more (Maxmedia)

Avantgarde Acoustic's all-new Mezzo G3 active loudspeaker system (powered by its own iTRON power amplifier) arrived Down Under just in time for the show ahead of its official launch at the High End Munich show weeks later, dazzling visitors not only with its orange horns but its equally beguiling performance too, not least its pin-point-precise stereo imaging when fed trip-hop electronica by the connected COS D10 streaming DAC/preamp.

Less orange but no less impressive for the money was another Maxmedia brand showcase in Innuous' Pulse player and Fezz Audio's tube Equinox DAC and Titania stereo amp driving Piega loudspeakers, the collective's rendition of Annie Lennox's *Put A Spell On You* a clear show highlight! And lest we forget the brightest corner of the room — Leica's Cine 1 Cinema TV, a glossy advert for the increasingly popular big-screen TV-style projection market. Demo it if you can.

## Beyerdynamic

The Beyerdynamic headphones stand from Australian distributor Synchronised Technology was visitors' first post-registration stop, loaded with award-winning, best-in-class cans from the German brand's diverse, budget-spanning catalogue — including the brand-new (but numbers-limited) DT 770 Pro X Limited Edition, which brings tech from the company's higher price points down to a $349 model. Not a bad way to start your audio show experience! Celebrating its 100th year in the business, Beyerdynamic isn't short of reputable pairs, and show attendees had the chance to discover why professionals consistently choose them for Broadcast, Film and Stage applications, as well as how their engineering transfers into stunning consumer headphones for home and away.

## Boomerang Records

If Beyerdynamic was a first stop for visitors, the adjacent vinyl racks from Boomerang Records were everyone's essential last stop, to load up on "just a couple" of takeaways from the Sydney-based store's trove of the black stuff and exchange collection stories with Boomerang's endlessly knowledgeable team (though we had to have a word about Led Zeppelin being filed under 'Metal'). Our *Sound+Image* editor Jez Ford betrayed his love of prog by leaving with a rare Fish/Tony Banks 12-incher under his arm, though also a more respectable (especially for a Brit) Masters Apprentices compilation.

# Floor 9

## Secret Chord Analogue

Secret Chord Analogue's often-packed room included demos of the "world's finest vinyl record cleaning method", Record Restore, whilst music flowed from 15-inch open-baffle Confluence Decor-series speakers, driven by neat and compact, red-fronted RedRoo electronics, the SE5 tube amplifier and PR5 tube phono preamp. Designed by Phil Wait, former staff engineer at *Electronics Today International* magazine, the RedRoos are available in kit form at a couple of levels, including completed circuit boards that require, he told us, "little more than a screwdriver" to construct.

## Revival Audio, Musical Fidelity & more (Audio Marketing)

Audio Marketing brought the latest release in the successful Revival Audio Atalante loudspeaker range from France to Sydney. The new Atalante 4 sounded super-clean in a more conventional tower-like design rather than the wonderful width of the brand's first two giant standmounts, yet with the same Atalante engineering and French-built design details. The speakers were generously powered by the 550-watt Musical Fidelity M8xi integrated amplifier, while the source topping the stack was MF's acrylic aesthetic wonder, the $18k M8xTT turntable, which was playing, among others, an LP collection issued by Inakustic, whose giant cables linked all the components.

## Microphase Audio Design

M.A.D. speakers are renowned for their extraordinary clean midrange, which was certainly demonstrated up on the ninth floor but also supplemented by the more significant bass performance of the company's latest Tower 4 design, now representing the highest level of M.A.D.'s iteratively expanded lineup. This is the first model to introduce an MTM-arranged pair of 13cm midrange drivers flanking the tweeter, while below are twin active 10-inch bass drivers in a push-pull arrangement, each powered by a 150W MosFet amplifier. From an eclectic collection of electronics on hand, the company's Jean-Marie Liere used a classic Quad 606 amp to drive the Tower 4, which were most definitely on song, our favourite demo a thrilling delivery of London Grammar's *Hey Now*.

## Yamaha Music Australia

Yamaha had two rooms up on the ninth floor, the first pairing its relatively modest-priced 2000 Series electronics with the NS-2000A floorstanders finished in that renowned piano-black gloss, and everything on Les Davis Audio Entropic Isolators. We suffered through a visitor's choice of Simply Red, the system ruthlessly revealing its 80s' appallingness, before the demonstrator took mercy and switched to two

Avantgarde Acoustic's latest showstoppers

gorgeous slices of Lana Del Rey in *The Grants* and *A&W*, thus reassuring us of the enveloping 'True Sound' abilities of the 2000 Series.

Next door was Yamaha's reference 5000 Series system, and no such reassurance was required there, despite the Giant & Tremendous turntable not initially being used in this usually all-analogue system (it arrived late). Instead, we enjoyed (greatly) the 5000 Series pre/power and speakers' abilities when fed Tidal streams. We also enjoyed the Yamaha team's all-new 70th-anniversary (of hi-fi products) t-shirt, almost as much as we did the deck's performance when it finally arrived for the Saturday showing.

Yamaha also delivered the biggest competition prize of the show: a pair of the $7,499 YH-5000SE orthodynamic headphones, so the room held a regular flow of entrants getting their cards initialed and entries assured.

Yamaha's reference system, including its GT-5000 deck

## Bowers & Wilkins, Marantz & more (again) (Masimo Consumer)

A natural next stop following Masimo's double-room exhibit on the lower ground was its representation on floor nine, which hosted a dynamite demo of Bowers' latest Signature edition, the 702 S3 Signature, with luxurious Datuk Gloss finish, internal upgrades and just a little gold bling trim. Driving the system was Marantz's Model 50 amplifier, with the newly award-winning CD 50n spinning CDs and streaming, plus the calming influence of a Furman power conditioner. Top tunes during our visit included Joshua Bell's *Slavonic Fantasy in B minor* and Beats Antiques' *Surges*.

## Kudos Audio, Copland, VPI & more (Audio Magic/Krispy Audio)

Audio Magic and Krispy Audio shared room 907 and delivered one of our personal favourite-sounding rooms. The cunningly chamfered Kudos Audio Titan 808 speakers were effortlessly rolling out the tunes under the command of Copland's CTA407 tube integrated, almost invisible in black at the top of one rack, while a VPI Scout turntable topped the other, above the very new Manley Oasis phono stage from California (which replaces the highly regarded Chinook). Digital tunes came from the versatile Lumin P1 streamer, DAC and preamp. Glorious.

## Harbeth, Ayre Acoustics, Bergmann Audio & more (Audio Magic/Space Hi-Fi)

Audio Magic teamed up with Space Hi-Fi for its second show room. It's always a pleasure to relax in front of a pair of Harbeth speakers, here the Super HL5 Plus XD model with their Harbeth-made 200mm RADIAL2 mid/bass driver, connected with Ultra Black II Tellurium cables (which Space Hi-Fi is, at the time of writing, including for free with the speakers). Johnnie Bergmann's very black air-bearing turntable from Denmark wasn't playing when we visited, but we greatly enjoyed digital tunes served from Aqua's LinQ network interface Formula xHD DAC, playing through an Ayre pre/power combo of the KX-5 Twenty preamp and fully discrete, fully balanced, zero-feedback VX-5 Twenty power amp.

## Auralic, Rogue Audio, Devore (Mcleans Smarter Home Entertainment)

Mcleans Smarter Home Entertainment always provides a darkened listening haven, and this year was equipped with Devore Fidelity Orangutan O/96 speakers — designed especially for compatibility with lower-powered valve amps, though Mcleans brought something rather higher in the wattage department, with 90 watts of pure valve power from the four matched KT88s in the Rogue Audio Stereo 100 power amp, which took its lead from Rogue's RP-7 preamp. An excellent choice of tunes — including Diana Krall's take on *Desperado*, and Nick Cave's *Into My Arms* — made this a room hard to leave.

## MartinLogan, Anthem, Bluesound (Audio Active)

Audio Active switched out its planned Sony/Theory demo for a wall of MartinLogan's surprisingly affordable Motion XT loudspeakers, with their Gen2 Obsidian folded-motion (aka Oskar Heil) tweeters. The Motion XT F200, F100, and B100 standmounts offered up a good spread, powered by Anthem stereo amplifiers: the STR preamplifier with its (excellent, in our experience) ARC room correction, and the matching STR power amplifier, capable of 400 watts into eight ohms and 800 watts into two ohms — all playing tunes sucked from the ether by a very reasonably priced streamer from fellow Canadians Bluesound.

## Serhan Swift

Serhan Swift brought its brand-new mµ3F floorstanders, as well as its award-winning mµ2 MkII standmounts. The floorstanders are a 2.5-way incorporating two differently tuned cabinets in an arrangement which present a friendly impedance curve, making them easy for amplifiers to drive accurately. Both Brad Serhan and Morris Swift were on hand to explain the speakers and argue over music selections; they went for a 2.5 over 3-way design, they said, to avoid a second crossover at critical listening frequencies.

A late bonus in this room came from the inclusion of the latest wonderbox from fellow Australians DEQX, also on hand to explain its boffin-brained latest creation. Years in the design, and still in beta software, DEQX's new Gen4 LS200 is the first DEQX processor to come with amplification in the same chassis. It performs speaker correction first, and room correction only secondly, and can do so for not only passive speakers but also up to 4-way actives. It can now use cloud computing instead of requiring a PC to run the software, too. So this was another room thrillingly showcasing the skills of Australia's homespun hi-fi industry.

## Sennheiser Hearing

Sennheiser Hearing (the consumer division) brought its award-winning Accentum Plus wireless noise-cancellers and its very latest Momentum Sport wireless earbuds, which integrate both heart rate and body temperature sensors and are compatible with popular fitness apps including Apple Health, Garmin Connect, Peloton, and Polar.

With the new owners of Sennheiser Consumer being a Swiss medical company, we were also interested to discover the Conversation Clear Plus earbuds, designed as hearing supplements to cut out room noise and focus on the speaker in front – just the thing for all those restaurants with horrible hard acoustics.

Plenty of full-sized cans were there for the auditioning, while also in attendance was the latest junior member of Sennheiser's Ambeo soundbars, the Ambeo Mini.

## AudioSolutions, Vitus Audio, Silent Angel & more (Hi End Audio/Absolute Hi End)

Hi End Audio and distributor Absolute Hi End brought the brand-new AudioSolutions Figaro M2 loudspeakers (reviewed on page 36) in a very fetching shade of electric blue, these fabulous floorstanders being driven by the all-dancing

Sennheiser Hearing's HD legends

and definitely all-singing Vitus Audio RI-101Mk2 amplifier/streamer/DAC, along with Silent Angel's dinky switches and streamers, the new $34k SoulNote A3 SE amplifier, and Vyda Orion cabling throughout. During our stay, we particularly enjoyed a powerful dose of Yello, the Swiss electronica pumping forth alive and real from these highly stylish speakers and thoroughly high-end components.

## Richter

Richter delivered perhaps the most unexpected demo of the whole show. We were fully impressed with the performance of the latest Wizard S6 Plus floorstanders — just perfect: tight yet bouncy, vocally beautiful and yet, at $2,899, among the least expensive loudspeakers at the show. They ran from a suitable and reliable combination of Bluesound streaming and Musical Fidelity amplification.

But then Richter's Brian Rodgers played the same tune (Jane Monheit's version of *Honeysuckle Rose*) through a wider-situated pair of the company's new Unicorn LCR 'centre' speakers, and then again with the Unicorns standing up vertically. Rear adjustment switches on the Unicorn allow for horizontal or vertical use, as well as tuning for left or right positioning, and with a 1-1.5dB lift over 3-10kHz available to improve dialogue as an optimal centre speaker. So one Unicorn could operate as a centre, two as a stereo pair, or three for LCR in a home cinema set-up. And the sound is a perfect match for Richter's other S6plus speakers, lacking only the lowest substance that a subwoofer would bring to a full system. The Unicorn is, therefore, Richter's most versatile speaker ever, and made for an odd but certainly sensational demo. Attendees were clearly impressed too, with the Richter room receiving plenty of 'Best Sound' votes for a 'Runner Up' result.

## Dellichord / Stereotech

Dellichord's Australian creators, Stereotech, were on hand to introduce — and explain — both its newly-award-winning isobaric four-driver FR6 standmount speakers, and its brand-new and highly intriguing FR2035 IsoActive System, which combines an FR35 bookshelf monitor atop an FR20 IsoActive bass module, both powered by internal amplifiers delivering 250 watts into their four ohms.

Driving the passive speakers were Exposure amplifiers, while an Aurender streamer was sourcing the tunes.

A cutaway of the FR6 usefully demonstrated its hidden additional isobaric midrange driver, and the space that drives its rear passive radiator; "otherwise hardly anyone realises that isobaric means there is another identical drive unit inside the box," they told us.

## AlsyVox, Aries Cerat, Pink Faun & more (PuraSound)

In our opinion and that of show attendees, PuraSound hosted one of the most impressive rooms of the show, largely thanks to the bewitching AlsyVox full-range ribbon loudspeakers from Italy. Those being demoed were actually one of the brand's smaller models, despite weighing 85kg each, using two panels 58cm wide and 1.44 metres high, and with 93dB reference sensitivity, making them easy to drive.

Doing the driving on this occasion was the $75k Aries Cerat Aperio integrated amplifier with its innovative TriodeFet technology, while on the floor in front were two simply massive Ithaka ladder DACs, each channel using 24 parallel switched resistor ladder converters. Pink Faun's 2.16 Ultra digital server/streamer supplied the songs, with the system completed by cables from Luna and Skogrand. PuraSound's Robert Campbell predicted to us that this system would be an addictive listen; he was not wrong.

## PSB Speakers (Amber Technology)

Amber Technology came armed with new PSB Speakers, running the latest Imagine T65 floorstanders from the 50-year-old Canadian company founded by the great Paul Barton, with source streaming and power from sister Canadian company NAD.

Amber cleverly built in a second demo, bringing two pairs of Imagine T65 towers. The black pair sat straight on the hotel carpet while the white pair perched atop a set of IsoAcoustics isolating feet. A switch box (supplied by IsoAcoustics) then allowed seamless comparison between the isolated and unisolated speakers. The difference was clear; this was the second time we had heard this IsoAcoustics demo, and the second time the difference has been more than we expected — so much so that we (again) headed round the back to check for cabling furfies. Finding nothing (other than being unable to assess the switching box itself), we suspect the effect must be real.

Amber Technology understandably couldn't resist bringing along the fantastic flagship Synchrony T800 too, even if they really belong in a much larger room!

Our thanks to everyone who visited or exhibited at the Australian Hi-Fi Show this year — one day of tropical rain and two days of sunshine, three days of fine music and AV entertainment across four floors of the Novotel Central Hotel.

Let's do it all again next year!

Richter's new S6plus models

The iFi Zen DAC's output can be switched between fixed and variable so that it can operate as a digital preamplifier.

# Headphone amplifier, DAC — or both?

So you have a strictly analogue or a digital-friendly system pride of place in your living room, likely comprising a source, stereo amplifier and pair of loudspeakers either way. But if it is the latter kind, you might consider adding another component: a dedicated DAC. And with either system type, if you spend considerable time listening to it through headphones, you may well benefit from adding an external headphone amplifier. Perhaps both upgrades are on the cards, or even one upgrade that will take care of both. So what does each do exactly and where would your money be best spent?

## What is a headphone amplifier?

At its core, a headphone amplifier is an amplifier circuit that is specifically designed to drive headphones rather than speakers. That might sound like a simple enough task — after all, headphones are just small speakers, right? But perhaps because the job seems so simple, it turns out to be a bit of a blind spot for many manufacturers and is usually given a low priority.

While dedicated headphone outputs have faded from many phones (thanks for that, Apple), they still exist on a huge array of components spanning the audio and video fields. And at the most basic level they work: you connect your headphones and get a sound. That might be enough for some people, but you are reading *Australian Hi-Fi* magazine and know that sound quality matters.

So, how is a headphone amplifier different from a conventional amplifier? Well, speakers require more power than a pair of headphones, which makes sense if you think about the difference in the size of space each operates in — consider a listening room compared to just your ear cavity. That vastly lower power requirement means that a headphone amplifier circuit has to be engineered to excel at low signal levels, and many simply aren't designed to do that.

It is not just about muscle, though, as the electrical loading of headphone drive units is different from that of speakers. Most speakers have a nominal impedance of around eight ohms, with some falling to half of that. Headphones tend to have far more of a spread, typically going from 16 to 600 ohms.

The amplifier designed to drive them must be happy working with such a range of electrical loads. It isn't uncommon to find a unit where the headphone feed is simply an attenuated version of the signal coming out of the speaker terminals. This is an affordable and easy but ultimately limited way of doing things, and poor sound is

**Start out with good source material — don't expect miracles if all you're throwing at a DAC is 128kbps MP3s!**

often the result.

Buy a dedicated unit and the story is very different. Here, headphone sound is the priority and so every care is taken to get the best performance. Component quality is higher and the power supply is optimised for the task at hand. Essentially, everything is geared towards delivering the best sound inside the operating range of the headphones — hand meets glove. Good examples of headphone amps at both ends of the price spectrum are the entry-level iFi Zen Can and premium SPL Phonitor xe.

Headphone amps are wholly analogue devices in their most basic form. They tend to be purist units with a handful of line-level inputs. Outputs can be more varied, with the traditional 3.5mm and 6.3mm headphones sockets sometimes augmented by various balanced connections such as the 4.4mm Pentacon.

But it is certainly possible to buy a headphone amplifier with digital wizardry...

## Introducing the 'DAC/ headphone amp'

Digital-to-analogue converters with headphone outputs (only slightly more catchily known as 'DAC/headphone amps') are now more prevalent than straight-up headphone amplifiers due to today's increasing digital dominance, and the best of these can be exceptional performers.

So, just briefly, an explanation of the DAC part. The sounds we hear on a day-to-day basis — traffic, instruments, that baby screaming on your otherwise peaceful commute — are transmitted in soundwaves, which travel through the air to our ears in a continuously varying analogue signal.

Analogue audio recordings were stored on the likes of shellac (and later, vinyl) discs, and then on magnetic cassette tapes, but the fragility and unwanted noise of these formats made way for something new. The CD was born, kickstarting the digital audio revolution into the streaming-dominant music world it is today.

Now, digital audio takes a very different approach to that of analogue. Digital music files are usually found in the form of Pulse Code Modulation (PCM) and are created by measuring the amplitude of the analogue signal at regular intervals. The value of the amplitude is represented as a binary number (comprised of 1s and 0s), and the length of this number is referred to as 'bit depth'. The timing of the measurement intervals is called the 'sampling rate'.

When recording a standard CD, say, a sample is taken 44,100 times per second. Each of these samples is measured to an accuracy of 16 bits, storing the results in a 16-digit binary format. Therefore, 'CD-quality' audio refers to 16-bit/44.1kHz recordings.

Record a 'high-resolution' track, on the other hand, and you take a step up to 24 bits, with a sample taken as often as 192,000 times per second, making for 24-bit/192kHz recordings.

Digital audio data can be stored in a variety of sample rates, bit depths, encoding and compression formats, but no matter how it is all done, it is a DAC's job to make sense of it. It must translate it as accurately as possible from its binary format to return it as close to the original analogue recording as it can.

While it's true that just about every piece of digital audio kit features a DAC — computers, tablets and phones, for example — it's just as true that not all DACs are created equal. For starters, they might not support all file formats and data rates in your music library (or the library of your streaming service of choice). But the biggest problem in such everyday, multi-tasking digital devices is that their DAC circuits are typically not efficient enough to accurately process the conversion and thus do justice to the original recording. And that is why upgrading to a separate, external DAC can be the simplest and most effective way of getting the most out of digital music, whatever your setup.

Poor converters can introduce unwanted noise during playback due to poorly designed circuitry, not to mention add extra distortion due to jitter. (Jitter is best defined as digital timing errors. The precise timing of a digital music stream is vital to high performance, and if that isn't done properly — usually because of poorly designed digital clock circuitry — performance inevitably suffers.)

Jitter problems can arise every time a digital signal travels around a circuit board, and are particularly troublesome when one is transferred between devices. In recent years there has been a rise in the asynchronous DAC, which takes over timing duties from any computer it may be connected to for exactly this reason.

The digital clocks found in dedicated DACs tend to be more accurate than those used in the average PC, so generally they perform the conversion process much more faithfully.

Of course, to get the most from a DAC in the first place you need to start out with good source material — don't expect miracles if all you're

Audiolab's versatile M-DAC model has long been favoured for its generous connectivity and equally lavish performance.

Even something compact and portable like the Chord Mojo 2 can be used in a hi-fi system; simply use a 3.5mm-to-RCA cable.

throwing at a DAC is 128kbps MP3s! In fact, better decoding of such a compressed signal can make any sonic shortcomings more obvious. You'll hear optimum results with CD-quality or, better yet, high-resolution audio, which is often stored in lossless PCM formats such as FLAC, WAV or ALAC (Mac), or alternatively DSD.

As for the DAC/headphone amps themselves, they come in all shapes and sizes and offer varying levels of inputs and functionality, so you'll need to consider how you want to use one, not to mention the budget you have set aside.

Compact USB DACs offer portability and convenience at a reasonable price. They vary from USB sticks, such as the AudioQuest DragonFly Cobalt, that plug straight into a laptop (or to a phone via a converter dongle), to 'wireless' DACs like the iFi GO Blu that can connect to a source (though not your headphones) via Bluetooth, taking one cable out of the equation.

Some draw their power from your connected device so that there's no need for an extra power source, and they largely keep connections simple, with just a headphone socket and possibly also a line-level output for hooking it up to powered speakers or a hi-fi system.

If you need more connectivity and aren't concerned about taking your DAC around with you, a more desktop-suitable unit, such as the Cambridge Audio DacMagic 200M or Chord Hugo 2, might be more suitable. These are typically bigger and require their own power source, but the advantage is often several digital/analogue audio inputs in addition to a USB input for connecting your computer.

Finally, some DACs are born to work as part of a bigger home audio system. These will usually have even more inputs — particularly more niche sockets such as AES/EBU — and potentially more features, including tone controls and a dedicated preamplifier section. They will support the full range of high-resolution music formats and might have a built-in Bluetooth receiver for accepting streams wirelessly from your phone or tablet, though such offerings are also increasingly offered by portable and desktop models nowadays. These home DACs tend to be at the higher end of the market and so should deliver higher performance, too.

Examples range from the sensible Audiolab M-DAC+ to the extravagant Chord DAVE or, if money really is no object, something like the Nagra HD DAC/MPS.

## Just a DAC?

Just as you can get a headphone amplifier without a DAC, you can get a DAC without a headphone amplifier. The Chord Qutest, for instance, omits headphone sockets and features, offering simply a pair of RCA outputs, and is designed to slip into a system as the middleman between a digital source and a stereo amplifier to enhance performance.

DACs *with* headphone amps can often be used in the same way, by the way. The Audiolab M-DAC+ complements its 6.3mm headphone jack with stereo RCA, XLR, coaxial and optical outputs. But why essentially pay for a headphone circuit you won't be making use of?

## So, should you buy one?

There are reasons not to buy a headphone amplifier, mind you. The additional cost is one. Another is the fact that it's another box to house and its additional cabling creates more mess. Maybe the headphones amplifier stage in your stereo amplifier or other system component sounds good enough already.

Likewise, as the advantage of a DAC/headphone amp combination is the potential to get better sound from your digital sources, that only happens in reality if the unit has better digital processing capabilities than the source you currently have — which isn't always a given.

It is also fair to say that your headphones must be of a fairly good standard for you to truly reap the rewards of having a dedicated headphone amplifier. Think Austrian Audio's Hi-X15 ($190), the similarly priced Grado SR80x or, in the case of earbuds, Shure's Aonic 3 ($369) as decent starting points here. On the other end of the scale, if your tastes (and budget) are more discernible and your cans cost ten or twenty times that price, you will of course require a headphone amplifier of a similarly high-performance level.

In most cases, a carefully chosen dedicated headphone amplifier, standalone DAC, or DAC/headphone amp will offer a sizeable step up from what you have built into your components, and the sonic improvements it brings will easily justify the outlay.

The legendary Sony TCD-D7 portable digital audio tape recorder (Image credit: Binarysequence, CC BY-SA 4.0).

## The (R)evolution of Portable Audio – Part 5

# Back in a flash

**The path to portable digital music would be potholed with failed products and legal threats, but as Darren Yates writes, it was the personal computer that finally brought music into the 21st century...**

As we have seen throughout this series so far, any portable audio revolution is usually preceded by years, or even decades, of research and development before an idea reaches a level of maturity for it to take off. However, an idea of Toshiba electrical engineer Fujio Masuoka was so far-reaching that it would have ramifications well beyond the field of portable audio. As tech giants Sony and Philips were prepping the Compact Disc, Masuoka's invention of fast-erase floating-gate memory would set in motion the development of the world's first practical no-moving-parts data storage device. The global technology industry, portable audio in particular, was about to move into the fast lane.

### No moving parts

Masuoka had already been quite prolific during his early days at Japanese tech titan Toshiba. He had developed the 1Mbit Dynamic Random Access Memory (DRAM) chip in 1977, but his true passion was for a memory chip that didn't need power to retain data. Electrically-Erasable Programmable Read-Only Memory (EEPROM) was the hot storage technology of the 1970s and, unlike standard DRAM that powers our PCs today, could retain data when power was removed. What made EEPROM so important for its time was that it only required an electrical voltage to erase data — previous chips required ultraviolet light to do the job. Even so, the erase process in EEPROM was still quite slow, though that didn't stop it from being used in early computer systems. In fact, it still appears in many household devices and appliances (including washing machines).

Masuoka's 1980 invention enabled the erase process to occur almost instantly, by grouping memory cells together in 'pages', to which a voltage could be applied, erasing the cells in bulk. The name 'flash' was suggested due to this new erase speed. Sadly for Masuoka, however, Toshiba failed to grab its opportunity to lead the flash-memory market. In 1994, he quit Toshiba and returned to Tohoku University. Since then, Toshiba's Westinghouse nuclear plant division filed for bankruptcy in 2017, forcing Toshiba to sell a majority stake in its memory chip business, Toshiba Memory, to private equity firm Bain Capital the following year. In 2019, the joint venture rebranded as 'Kioxia'.

### Digital tsunami

The 1982 launch of the Compact Disc changed consumer expectations for audio quality. Years of dealing with background hiss and noise reduction were gone thanks to this new technology delivering seemingly perfect sound literally on a silver platter. But the CD didn't solve the next question — how do you record digital audio? Sony's PCM-1 processor and Betamax video cassette recorder (VCR) combination may have been first, but with Sony conceding defeat in 1988 and releasing its first VHS recorder, neither Betamax nor VHS were the ideal option.

DCC decks were backwards-compatible and could play your old analogue cassettes (Image credit: JPRoche, CC-BY-SA 3.0).

Philip's Digital Compact Cassette used compression to store digital audio on tape (Image credit: Paul Forsdick, CC-BY 2.0).

However, the launch of the CD opened the floodgates, as new media formats attempted to win over the home-recording market.

## Digital Audio Tape

One of the first was Digital Audio Tape, or DAT. Released in 1987, DAT was a cassette format larger than a MiniDV video camera tape but smaller than the original Compact Cassette. Essentially, a DAT recorder was a mini VCR, pulling the 3.81mm-wide magnetic tape around a cylindrical drum recording head. Similar to how VCRs operated, the head used a 'helical scan' technique in which multiple heads spun around at 1500rpm while the tape itself was pulled horizontally around the drum at just 8.15mm per second. DAT allowed for the recording of lossless PCM stereo audio at up to a 48kHz sample rate and 16-bit depth (32-bit/44.1kHz was also supported).

DAT resulted in some of the most compact recorders seen to date, including Sony's TCD-Dx series models. Other manufacturers also hopped onboard, such as TASCAM with its DA-P1.

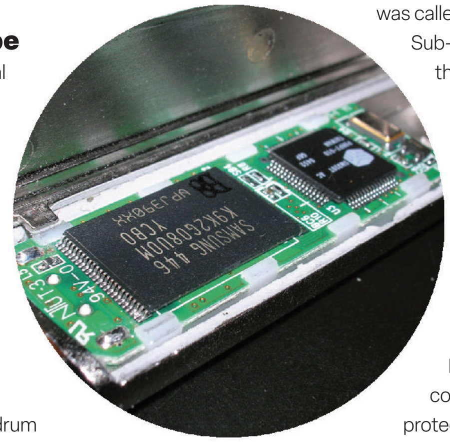
However, the Recording Industry Association of America (RIAA) was less enthusiastic. For the first time, the home user could make copies of CDs that were as good as the original, and this led to an RIAA executive threatening to sue any company that attempted to launch a consumer-grade DAT recorder in America.

Sony's purchase of the giant CBS Records in 1988 reportedly calmed tensions, but in the end, DAT failed to achieve the success it gained in Japan and faded from the market during the noughties. Nevertheless, before the arrival of the optical CD-recordable format in the mid-90s, DAT was indeed the only lossless digital audio recording format available to consumers.

## Digital Compact Cassette

Meanwhile, Philips couldn't just let go of its Compact Cassette; it explored options to create a digital version. DAT's helical scan or 'rotary' head assembly was costly to produce, so Philips combined with Panasonic founder Matsushita to create a new type of stationary or 'fixed-position' head, similar to that used in the original compact cassette. What's more, Philips' aim was for this Digital Compact Cassette (DCC) to use the original's 4.75cm-per-second tape speed and 3.8mm tape-width, but *also* make its DCC cassette decks backward-compatible so it could play original Compact Cassettes too.

However, there was a problem: using a fixed head reduced the bandwidth to a point that standard PCM was just not an option (which is why DAT used helical-scan heads). The solution launched in late '92 and was equally as radical — Philips developed what was called 'Precision Adaptive Sub-band Coding' to reduce the audio bit rate from over 1.5 megabits per second (1.5Mbps) to just 384 kilobits per second (0.384Mbps). The compression format would eventually be rolled into the first MPEG audio standard (MPEG 1 Layer 1). The DCC format also included commercial copy-protection to prevent home users from making digitally perfect copies of commercially bought music DCCs. However, DCC didn't take with the market. By 1997, Philips had discontinued the technology and the 'compact cassette' era was effectively over.



Flash memory has made all of our portable devices possible (Image credit: Nrbelex, CC BY-SA .30).

## MiniDisc

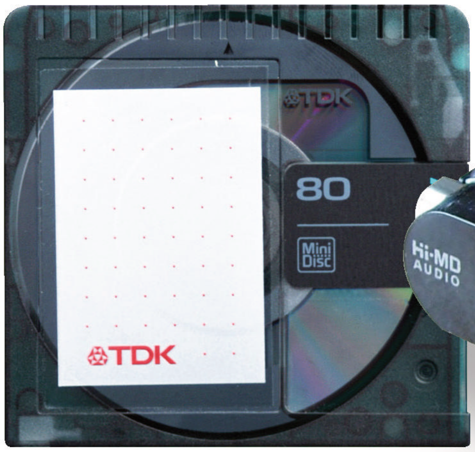
As Philips and Matsushita were readying DCC for market, Sony was putting the final touches on its consumer DAT replacement. Instead of a cassette mechanism, Sony went for an enclosed 'floptical' disc-style format it called 'MiniDisc'. Rather than being purely magnetic, the disc media was a combination magneto-optical and used a magneto-optical head. Like CD, MiniDisc used a laser diode to read data, but the difference here was that the laser was used to heat the recording location while the magnetic portion 'wrote' the data to the disc. Recordable discs would eventually be available in 60-, 74- and 80-minute durations.

**The CD opened the floodgates; new media formats attempted to win over the home-recording martket**

Like DCC, MiniDisc not only came with protection to prevent digitally perfect copying but also used audio compression. The compression format was a Sony invention dubbed Adaptive Transform Acoustic Coding, or ATRAC. While it dropped the 1.5Mbps PCM datastream down to approximately 300kbps, Sony did enable later MiniDisc systems to record in the standard PCM format.

However, by that time, MiniDisc was fairing only marginally better than DCC. Sony doubled, then quadrupled, the disc recording time through higher-compression ATRAC extensions 'LP2' and 'LP4', but the latter was more suited to voice recording than music. Nevertheless, MiniDisc only finally left the market when Japanese brand TEAC dropped its consumer and professional offerings in 2020.

The original iPod changed the way many listened to music on the go (Image credit: Apple).




The Sony-designed MiniDisc used ATRAC audio compression to fit 80 minutes on a disc (Image credit: Ramon Vasconcellos, CC BY 3.0).

The Diamond Rio PMP300 was one of the first flash-based audio players to hit Australia (Image credit: Public Domain).

Sony's MZ-RH1 was arguably the pinnacle of MiniDisc portability (Image credit: Zlois, CC BY-SA 3.0).

## CD-ripping

Until the arrival of flash-based music players in the late 90s, music was typically a lossy business — consumers had to copy LPs or CDs onto other media, whether that be cassette or MiniDisc, using analogue-transfer techniques that resulted in an overall loss of audio quality. Flash-based music players (and later MiniDisc models) changed this and brought a new entertainment device to the process — the desktop computer. New terms such as 'CD ripping' and 'audio compression' entered the broader lexicon as consumers began searching for software to 'rip' their music CDs into compressed audio formats such as MP3.

By now, Compact Disc technology was heading towards 20 years old — it arrived just weeks after the Commodore 64 home computer, so it's hardly surprising that little thought was given to the possibility that one day consumers could use their computers to make digitally perfect copies. But the mid-90s 'Internet Revolution' had seen multimedia PCs with CD-ROM drives increasingly finding their way into homes. It's perhaps only because the earliest flash-based music players measured their storage in megabytes and not gigabytes that forced consumers to use lossy compressed audio formats such as MP3 and ATRAC, rather than use lossless PCM copying.

**The iPod completely transformed portable audio, changing how and where we consumed music**

## Peer to peer

In fact, the fear that led some music industry executives on a collision course with DAT was that consumers would begin making digitally perfect copies of CDs and start sharing those tapes around, cutting the bottom out of the then-lucrative music business. While the DAT threat didn't eventuate, all the ingredients were ready by the late 90s for a situation that would potentially be far worse.

In June 1999, those ingredients came together in the music-sharing website Napster. Combining almost-instant access to thousands of songs through a free and slick web interface saw Napster's star rise. However, it was more of a shooting star, as the music industry rallied to the threat and filed lawsuits against the service. Just over two years later, Napster was shut down by the U.S. court system. But with Napster, at one point, said to have had 80 million users, the growing realisation within the tech industry was that a new market opportunity beckoned.

## Right place, right time

The story of how Apple nearly lost its way and only survived thanks to US$150m from Microsoft boss Bill Gates in 1997 is well known, yet in the space of just two years the company went

The iPod Mini in 2004 was Apple's first no-moving-parts music player (Image credit: Apple).

Music players rarely got smaller than the Apple iPod Shuffle (Image credit: Apple).

from rags to riches on the back of its booming iMac design. Apple wasn't done yet, however; in January 2001 it launched the app that would go on to change how millions around the world consumed their music — iTunes. The for-Mac-only iTunes app was reportedly a redesign and development of SoundJam MP, which Apple had bought the previous year. Quickly, Mac users became iTunes' greatest advocates as they began cataloguing and grouping their music library. However, the app itself was only one half of a double-act that would change the music industry forever — and consumers didn't have long to wait.

## One more thing

When Apple then-boss Steve Jobs announced in October 2001 the company's plans to become market leader in the digital music revolution, he didn't actually say 'one more thing' (the phrase he often used from 1999 before revealing a surprise new product). But he did announce the product every other tech company then dreamt of having: the Apple iPod.

Apple certainly wasn't the first to market with a portable audio player, but it had the right ideas at the right time. Only a matter of weeks before the iPod's arrival, the music industry had successfully overcome the Napster threat. But any thoughts that it could stave off the future and expect consumers to go back to buying CDs forever was wishful thinking. The Napster furore would only be the beginning if the music industry didn't move with the changing demands of consumers.

Even without the Windows PC market, the iPod/iTunes combination was a winner. However, the first iPod was still an electro-mechanical device and not particularly sophisticated when you look back, relying on a 1.8-inch Toshiba hard drive of either 5 or 10GB capacity and powered by two ageing 90MHz ARM7-grade microcontroller chips. However, its revolutionary 'click wheel' control made navigating through song lists intuitive and easy. Apple was bringing a new design language to technology and consumers couldn't get enough.

Regardless of whether or not you're an Apple fan, the iPod completely transformed portable audio, changing how and where we consumed music. So entrenched in our psyche it became that it was only two years ago that Apple finally announced its end, with a 'last call' for the only surviving model, the iPod Touch.

## Buying music online

But by 2003, iPod storage capacity had risen from 5GB to 40GB — enough for over 10,000 songs, and it was clear that ripping that many CDs was no longer an option. The same day the 40GB model was announced, Apple also launched the new iTunes store. For the first time, consumers could legally purchase and download music online. A new Windows-version iTunes store client soon followed.

The staggering number of Napster users showed the vast potential of a music marketplace, and it was during 2002 that Jobs began the painstaking task of bringing the record labels onboard. Eventually, market heavyweights Warner Music and Universal agreed, provided safeguards to prevent wholesale copying (what became 'digital rights management') were incorporated. Further deals with BMG, EMI and Sony were eventually sorted so that a reported 200,000 songs were ready to go the day the iTunes Store launched in April 2003. But how did consumers respond? The store was an instant hit; more than a million songs were purchased in the first week alone.

## Market collapse

Nevertheless, what was so remarkable about the rise of the portable music player was just how fast the global market for them began unravelling less than a decade later. Music sales continued to boom, but as per usual a new device was coming — this time, one that would rewrite the definition of 'personal computer' and all but make the MP3 music player redundant.

Next time, in the final part of this series, we hit modern times, as Apple and new player Google sign the death warrant of the music player market with the launch of a new device that shows zero signs of slowing down.

Sony's PCM-1630 PCM adapter turned any VHS recorder into a digital audio recorder (Image credit: Akakage1962, CC-BY-SA 3.0).

# Pressing Issues

## Melbourne's two vinyl pressing plants on surging demand, keeping it local, and whether coloured vinyl really does sound worse…

A quickfire question for you: how many vinyl pressing plants does Australia have?

If you've just answered "zero", having soundly assumed that the Land Down Under might exclusively import records from elsewhere, as it does cars, then I'm afraid to say you are incorrect. But don't worry, you aren't alone: that was my hesitant guess too when asked by a vinyl-loving family member during their recent visit to see me (and probably more so some record stores) in Melbourne.

If your answer was "three", give yourself a big fat full point to redeem at the next pub quiz whereby you mark your own sheet… presuming you didn't Google it, you big cheat. (Or half a point if it was "two", seeing as the third plant only began operating less than two years ago. Nul points for anything else, sorry.)

So, in a country whose population is a third of the UK's population and which has just two IMAX cinemas, three vinyl pressing plants exist — Zenith Records (Melbourne) is getting on for 20 years old, while Program Records (also Melbourne) and Suitcase Records (Brisbane) began pressing four and two years ago respectively.

So what's behind the resurgence (if not to keep up with the demand for Taylor Swift wax!) and what does local access mean for artists? In celebration of this year's now-passed Record Store Day, I spoke to the co-owners of each Melbourne plant, Zenith's Paul Rigby and Program's Steve Lynch, to find out…

### AN UNLIKELY RESURGENCE

In the mid-'90s, a fella called Nick Philips of Melbourne-renowned garage-rock band The Breadmakers, saved Australia's — actually, the whole Southern Hemisphere's — only vinyl pressing plant at the time from the scrap heap in Sydney, and relocated the 500 miles to Melbourne. Philips told *Vice* magazine that it "singlehandedly saved vinyl record manufacturing in Australia", and it seems they had a ball for over a decade, pressing thousands of records, reviving direct-to-acetate recording, and hosting the likes of Sonic Youth and The White Stripes. But Philips sold up in 2005, and in came Zenith Records to build on the barebones of what was the Corduroy Records plant.

Paul Rigby was in the CD and packaging business at that time but had forged an alliance with a French record manufacturer and witnessed quite the increased growth in vinyl demand from 2008 onwards. After a few years of his business partner running operations low-key, they together decided that the local market demand required improved market responsiveness, quality and output. Now, Zenith Records does the job lot.

"In 2013 we set up operation in our current site in Brunswick East [20km south of the Cordoroy plant] and haven't looked back," says Rigby. "We now occupy four sites carrying lacquer cutting, galvanic plating, pressing, packing, sleeve glueing and paper inner sleeve glueing. We also have a dedicated engineering machine shop employing two CNC programmer operators designing and making innovative tooling, spare parts and associated machinery for the global vinyl pressing industry."

It rode solo for over a decade, and then Program Records came onto the scene in 2020, emerging, Steve Lynch tells me, from discussions around the difficulty local bands had in getting their albums pressed in time for release dates, and the considerable wait times at international plants. What a year to start up in the most locked-down city in the world! But Lynch notes that up until the late 2010s there were not many options for purchasing equipment to press records: "It was very difficult to source second-hand machinery so the only avenue to purchase were the new fledgling press manufacturers. Australia isn't big enough to have the multitude of presses that we see in North America and Europe but the music scene is strong so there was an opportunity to set up with the new availability of equipment."

When its two WarmTone presses from Canada manufacturer Viryl Technology arrived in 2020, but without the Virlytech technicians to assist in their installation due to the international travel ban, Program Records had to improvise. "Program's technician Luke Marinovich and I would come into the warehouse in the early hours of the morning to Zoom-call Viryltech and set these up ourselves with their instructions!" remembers Lynch.

The pandemic was a blessing to the industry in some ways, though. Both Rigby and Lynch spoke about the surge in demand for vinyl pressing, the consequential overseas pressing plants' backlogs and substantial delays, and how extra business came their way as a result of that. "It meant that customers' deadlines weren't blown out to over 12 months, which is what was happening in the US and Europe," recalls Rigby. "We found ourselves manufacturing export orders that would have otherwise been done offshore."

And there's plenty of business to go around, it seems, despite the number of vinyl pressing plants in the country effectively tripling in the past four years. That's not wholly surprising when you consider that in the past nine years the number of vinyl records sold has grown by 275%, from 315,000 (2015) to 1,184,000 (2023), according to Statista and Australian Recording Industry Association (ARIA) figures. That trumps the UK's 180% growth during that same period and isn't far off the US's 300% growth.

"[The competition has] helped us share the load of local and international demand and relieve pressure on just one local plant," says Rigby. "It has meant that there are alternatives in procuring vinyl locally.

"Our position has always been: if competition means more orders will be placed for locally pressed vinyl records rather than these orders going overseas, then it's a good thing."

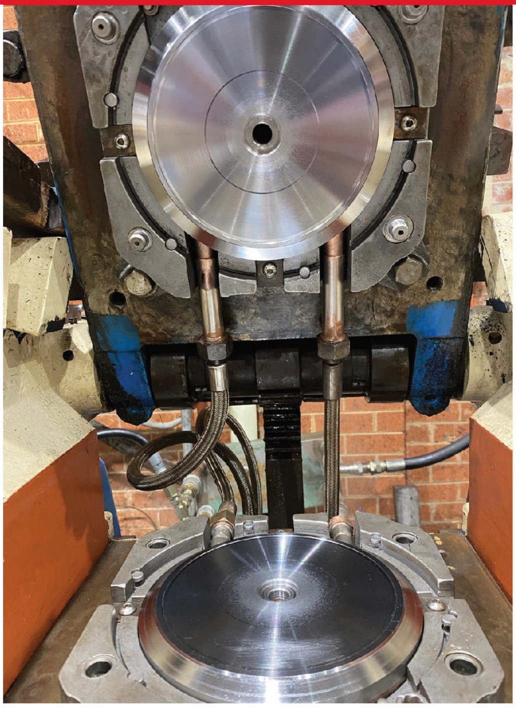
### KEEPING IT LOCAL

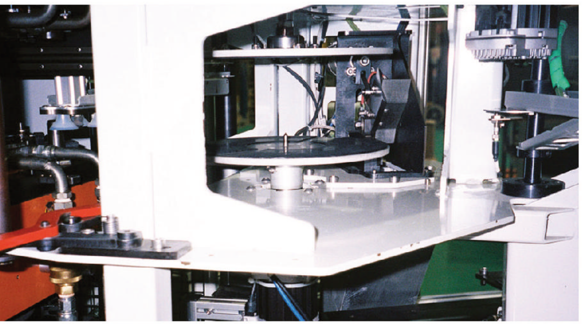
The two plants press records for both local and international artists and labels, though the local scene seems close to both of their hearts. "We love being able to press records from our local scene; there is something extra special about pressing records for bands/people you know," says Lynch, who also acknowledges that choosing a local pressing plant "supports local jobs, fosters a sense of community, and helps build a robust ecosystem for music creation in Australia". His favourite recent record? Program's pressing of 'The Map And The Territory' by Aussie post-punkers Exek.

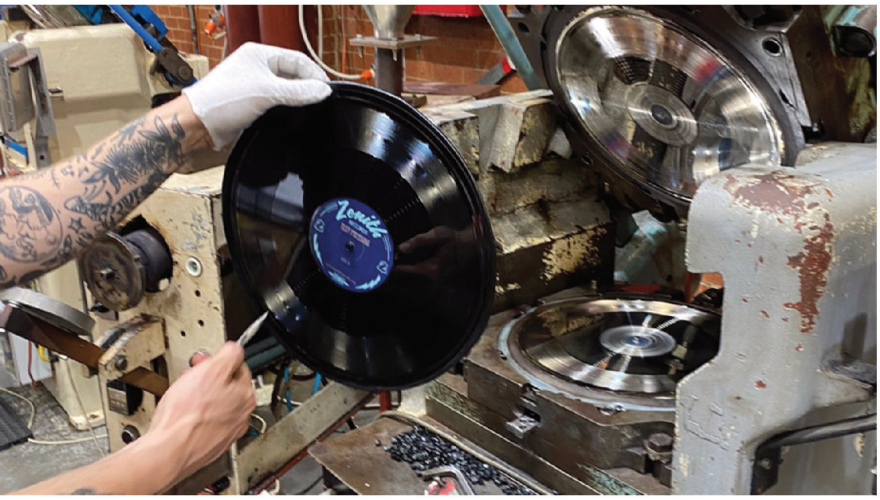
Rigby and Lynch recognise several benefits of staying local for the artists too. "Local plants offer faster turnaround times," says Lynch. "Artists and labels are also able to come and visit us when we have a test pressing or their records ready for them. This means they can get their records to the listener and onto store shelves more quickly as the record stays in Australia.

"Staying local also allows artists and labels to have more direct oversight and control over the production process. They can visit the pressing plant and communicate face-to-face with us."

Rigby, whose Zenith plant mostly presses records for Australian artists, agrees that manufacturing locally is cheaper, faster and gives artists greater access, plus it also helps with special events. "Occasionally we may be under deadline that means that part of the order needs to be ready ahead of the whole order and we have the flexibility to have customers come by and grab 50 or so units for a launch or a pre-release event, without having to factor in







Program Records' pressing plant factory in Thornbury, Victoria, where it presses hundreds of thousands of records for both major and independent labels.

global shipping, which almost always requires completion of the full order."

And then there's the ecological benefits. Rigby tells me that recently representatives from all three pressing plants in the country, alongside domestic record labels, distributors, retailers and artists, attended an inaugural roundtable event for the Music Product Stewardship Alliance (MPSA) to discuss the environmental impact of all aspects of vinyl record production and logistics.

"Interestingly enough," he says, "the major environmental impact was importation of internationally pressed product and the most sustainable way forward was to increase more local production, where possible."

Lynch reiterates this: "By pressing locally, artists and labels can reduce the carbon footprint associated with their music releases and support more sustainable practices. It also reduces the possibility of damage in transit as we are about five kilometres from the major distribution centres in the city."

Rigby admits that keeping it local might not make sense when a local artist's release has a larger market in Europe or the US, as having the whole order manufactured offshore and the smaller local component shipped back could then be preferable. But there's no denying that the availability of local pressers is a boon, and perhaps even an enabler, in many cases — particularly for smaller or grassroots artists after shorter runs of hundreds or thousands, as opposed to tens or hundreds of thousands.

## IN-HOUSE VS OUTSOURCING

Zenith and Program aren't just squirrelling away to service (mostly) Australia without ties to the international industry, mind you. The plants are pretty different beasts — Zenith is a fully integrated facility that does everything from cutting music onto lacquer to creating the metal 'stampers' used on the pressing machines, to the pressing itself, while Program presses after outsourcing the cutting to Bristol and Berlin, and the stamping to Sheffield.

Zenith's in-house operation is the more uncommon. Program's Lynch acknowledges how it requires significant investment and expertise — "mastery would take years!" — and that its overseas suppliers excel in their craft, saving the company time and resources.

This pressing plant model of using third-party stampers or having metalwork supplied by customers is adopted by many plants in the US and Europe. Indeed, Rigby acknowledges that some discerning customers may prefer to supply their own metalwork and/or have their lacquers cut at independent cutting houses around the world, but says that Zenith's model puts it in a position to control every aspect of the process, from start to finish.

"If we take on a job and are to be judged on our work, it is to be based on the whole job, rather than just pressing using plates that have been made elsewhere," he says. "It gives us more control, flexibility and facility to fix issues internally should there be any, which do arise from time to time with cutting and plating."

"I guess our structure has a lot more to do with setting up when there were no local cutting or plating facilities — as there were prior to the closure of the local vinyl industry in the early '90s — when access to US or European facilities was a lot more limited and our freight more expensive."

It's a model Zenith remains committed to, having recently undergone an infrastructure upgrade three years in the making and revolving around an additional steam boiler to increase capacity. ("The heating process in pressing vinyl records is primarily via steam and steam pressure and is a non-negotiable necessity to carry out vinyl record pressing," he explains.) The business is soon to commission a 1978 Lened Automatic press alongside its four manual Vintage Alpha Toolex pressers (and 1974 Neumann VMS 70 cutting lathe), too.

Zenith's ties to the international industry actually concern its engineering CNC machine shop. Since 2018, Zenith has developed its own moulds and dyes (which Rigby says do the heavy work in the pressing process) and is currently road-testing them in plants in Europe, the US and South America, hoping to improve their efficiency through the adoption of its tooling.

## AND THE MILLION-DOLLAR QUESTION...

I couldn't bypass the opportunity to ask pressers their thoughts on how coloured vinyl affects sound quality, since to some the choice between black and colour seems akin to that between a lobster roll or lobster-flavoured ice cream. It looks damn good (I mean, have you seen Tycho's 'Drive' on orange and red marble? Sexy or what?), but if quality-obsessive Jack White says black is best (flick to 38:39 in his interview with Zane Lowe at www.youtube.com/watch?v=TphsCoT2_s0) — and he isn't alone — it is a hard rebuttal to ignore.

"It's a bit of a mixed bag," admits Lynch, "the colours we offer will generally have the exact same sonic properties as black compound. There may be subtle differences in surface noise characteristics due to variations in plastics. Overall, the impact on sound quality is minimal, if present, and most listeners won't notice any significant difference between coloured and black vinyl records."

Program Records doesn't currently make splatter or picture designs, so Lynch couldn't speak of them from a manufacturing perspective, though Zenith Records does offer a disclaimer for the former which reads: 'Our aim is to ensure we achieve good sounding records, however the splatter process can introduce additional noise and must be taken into account when you order.'

"Black is always a safe bet!" says Lynch. Perhaps that was what just swayed me towards choosing Slowdive's 'Everything Is Alive' on black vinyl over Ludovico Einaudi's 'Live At The Royal Albert Hall' on red for my Record Store Day purchase, then. That said, I've made a pact with myself to get some local scene shellac next. After all, Lynch offers a poignant concluding message: "I think it's important for anyone who loves their local shop or their local scene to head out and buy a local band's record — not just a special RSD one!" Something to consider for next year, perhaps. **Becky Roberts**

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# esoterica

REVIEWED

## FROM MONO TO STEREO

Legendary Halcro Eclipse amplifier now packs both channels in one chassis

## One man's sound vision

In conversation with one of Australia's great AV assets

HALCRO
Eclipse

# Halcro Eclipse Stereo

## Power Amplifier

- Sensational sound quality
- Quiet and low distortion
- Handsome appearance

- Size!
- Weight!

RRP **$66,990**

I don't imagine many people would contradict me if I said that Halcro's Eclipse power amplifier — in either its mono or stereo version — is the most immediately recognisable amplifier in the world. It is so recognisable that in a pitch-black room it can quickly and easily be identified by touch alone. The Halcro Eclipse is also — albeit this time arguably — the most beautiful amplifier in the world, which is undoubtedly one of the reasons it has featured on the front covers of so many hi-fi magazines around the world, including here in Australia.

The story behind the amplifier's design is also one of the most interesting and unusual in audio. The intellect behind Halcro's creation, and indeed the brand's name, was South African physicist and engineer Dr Bruce Halcro Candy (you can see why he used his middle name!), who after founding the company and becoming world-famous for the very first amplifier he built (the Halcro dm58) was then head-hunted by Minelab, famous for its hand-held metal detectors, after which the company languished as no more than a listing in the Australian government's official register of company names.

It languished on that list until one sunny Saturday morning, when Lance Hewitt, who had been Candy's lead engineer, was adding to his collection of vinyl at a South Australian record store. The store's owner, who knew that Hewitt had formerly worked for Halcro, introduced him to Mike Kirkham of Magenta Audio, an Australian audio equipment importer, retailer and distributor who also happened to be at the record store buying vinyl that very same morning. Hewitt told Kirkham not only that he had been personally responsible for building and testing Halcro amplifiers but also that he happened to know that all of the circuit diagrams, PCBs and tooling required to build them were gathering dust in a storage facility — indeed, one not far from where they were chatting.

The result of this serendipitous Saturday morning meet is that Halcro was resurrected as a going entity. Kirkham phoned Dr Peter Foster, a friend of his who holds a PhD in physics from the University of Adelaide and was formerly a Senior Laser Physicist at Norseld Pty Ltd and a Guest Scientist at the University of Bayreuth, Germany. The result was the trio founding a new company, Longwood Audio, which in 2015 acquired all of Halcro's assets, including the brand name, the company's portfolio of patents and the all-essential machine tooling along with a batch of unsold mothballed stock.

Foster is now Longwood Audio's CEO, Kirkham is its Head of Sales and Marketing, and Hewitt is in charge of development and manufacturing.

### THE EQUIPMENT

The 'look' of the Eclipse Stereo is directly copied from the design of the original Halcro dm38, which was the work of Adelaide designers Tony Kearney and Max Dickison. Candy's brief to them was that, to ensure the correct operation of the amplifier, the electronics had to be separated into four heavily shielded modules — an audio power module, an audio drive module, an inductor module and a power supply module — and that, in order to remove the heat passively without using fans, the heatsinks for the output devices had to be extraordinarily large.

Those very design elements have been incorporated in the Eclipse Stereo. One important change, however, has been in the execution of the heatsink design. The original's design was microphonic so that at certain frequencies it could vibrate so significantly that its resonances were audible in the listening room. The heatsinks on the Eclipse Stereo, however, are non-resonant by virtue of being completely redesigned. The new design sees each section fabricated from up to 10mm-thick folded aluminium, with the winged sections fully damped and the joins connecting the horizontal chambers to the wing sections. The non-wooden sections of the chassis now come in either a 'Standard' powder-coat finish or a premium hand-painted 'Signature' finish, too.

If you are at all familiar with Halcro amplifiers, you will already have an inkling of how large the Eclipse Stereo's chassis is; if you're not, let me point out that a person of average height, when standing upright, will not need to lean down to touch one of the amplifier's vertical wings. Checking out the amplifier's proportions in the images accompanying this review should also give you an idea of how wide the amplifier is, but just to make it perfectly clear, the Halcro Eclipse Stereo power amplifier is not only 79cm tall but also as wide as it is deep (40cm). It's not lightweight either, tipping the scales at 62kg. (And, when eyeing the images, don't miss the fact that the shape of the chassis actually forms the capital letter 'H', which is pretty clever!)

The internal circuitry of the Halcro Eclipse Stereo inherits DNA from the original Halcro dm38, as well as from the Eclipse Mono, but according to Hewitt, while some things have been lost (such as the current mode inputs), many other aspects of the circuitry have been improved — some are the natural result of improvements in technology, some are the result of improvements in circuit layouts, and some are the result of research and development by Longwood Audio itself, for which Hewitt says the company has been awarded four patents.

Candy was always secretive about the circuitry of the Halcro dm38, and Longwood Audio is continuing this tradition. CEO Peter Foster told Paul Miller of *Hi-Fi News*: "We never release schematics [and] every circuit has the component designators engraved off and the boards are coated in an epoxy layer to further mask what's going on".

Miller says he was nonetheless able to glean the following information about the Eclipse Stereo: "The power supply is a two-stage switch-mode design with power factor correction. The first switch-mode power supply buffers the amplifier from the AC mains by generating a very high DC voltage from which the second power supply delivers the rail voltages for the power amplifier, [and] although the building blocks of the amplifier are conventional — a differential voltage-to-current input stage, current mirror, voltage line/preamp stage and, crucially, a unity-

> The 'look' of the Eclipse Stereo is directly copied from the design of the original Halcro dm58

gain power output stage employing 12 (V)FETs — the way they are implemented, all on six-layer PCBs, is where the proprietary thinking resides."

Further details of how the circuit might work are revealed in US Patent 6,600,367, which was granted to Candy and is currently assigned to Longwood Audio: 'An electronic amplifier providing very low distortion which includes an output stage with an output error correction stage containing two amplifiers and wherein there are at least four local negative feedback paths, an output of the first amplifier being connected to an input of output stage transistor buffers or output stage transistors through a first network, an output of the second amplifier being connected to an input of output stage transistor buffers or output stage transistors through a second network, where components of the first and second amplifier the local negative feedback paths, first and second networks and output stage transistor buffers are selected to form substantially second order local dominant pole. Also disclosed is the supply of power to said first and second amplifiers from a floating power supply means coupled to either an or the output of the output stage so that the voltage of the floating power supply will follow substantially an output voltage of the output stage.'

Also interesting are some of the patent's citations, which reference an active bias circuit for operating push-pull amplifiers in Class A mode (granted to one Nelson Pass), a distortion-free complemented error feedback amplifier method (granted to James Strickland), and reducing amplifier distortion by comparison of input and feedback from output (granted to Barry Elliot Porter). The patent also directly cites one Douglas H. Self. (For readers who are unfamiliar with these names, any audio engineer asked to name the world's top five audio amplifier designers of the last 50 years would include three of those names.)

Input and output connections are made on the module at the top of the amplifier, at the rear. The Eclipse Stereo has both unbalanced (via gold-plated RCA) and balanced (via gold-plated XLR) inputs, plus a 'low gain' unbalanced input. The speaker cable terminals are absolutely huge, and while they're supposed to be combination spade/banana types, the only way I could see to use banana plugs was to remove the screw-down knob that you'd use if you were using spades or bare wire. Perhaps the rubberised cap on the knob is removable, but I wasn't prepared to risk damaging it trying to pry it off!

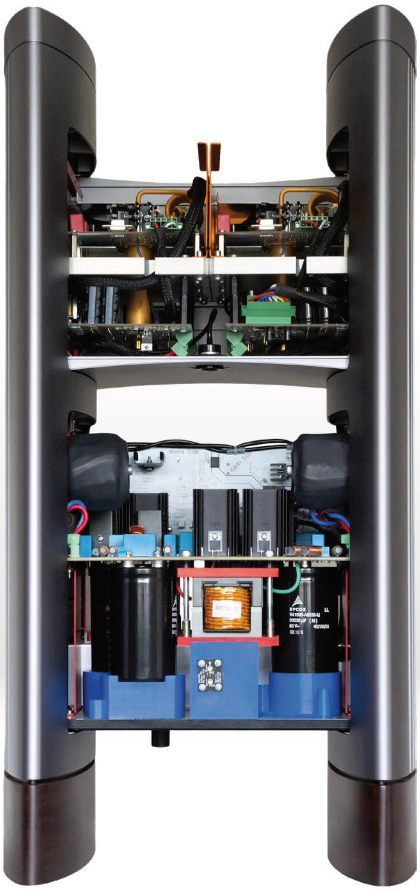
Halcro has built several sophisticated automated protection systems into the Eclipse Stereo to prevent it from being damaged by a variety of issues that could impact its performance, covering everything from power supply stability to problems that could affect the output stages. Longwood Audio says that the Halcro Eclipse Stereo amplifier "is short-circuit proof, has over-current limiting, has gradual power limiting if the amplifier becomes too hot, will cut out if a continuous DC offset appears on its output, will cut out if output current exceeds 12 amperes average continuously over a period of a few minutes, is protected against most input overloads, has power supply protection that will cut out if faults are detected in the power supply (such as over-voltage, master clock at incorrect frequency, excessive temperatures), and is protected against most mains transients". Even the standby switch is air-pressure activated rather than a traditional electrical switch to minimise interference.

It's good that there's such a high level of overkill on the protection front, because the company's secrecy about its circuits, including the values of the components used in those circuits, would mean that any fault could only be addressed by a technician with insider knowledge. Otherwise, the amplifier would need to be returned to South Australia — and given its size and weight, that would be rather an expensive exercise!

## IN USE AND LISTENING SESSIONS

My first audio experience of the Halcro Eclipse Stereo during testing was by way of an initial warm-up using music from a band with which I have a love/hate relationship: GoGo Penguin. Delivering amazing sound for what is essentially just a trio (percussion, bass and keys), the band's music has been described as a form of jazz for the modern age — but then again, is it? I love the sound but hate not being able to define exactly why it's so mesmerizingly great and find the group hard to recommend to others because their music is so polarising.

What I can say with certainty is that it really helps if you are listening to their music through an amplifier with the high performance of the Eclipse Stereo. For example, the double-bass on *Raven* (from the album 'A Humdrum Star') is not only beautifully captured in terms of sounding just like a double-bass should, but it's also just a lovely bass line — so inventive that you really can't foretell the next note, as you can with performances by many lesser bassists. In delivering this line so well, Nick Blacka provides a unique counterpoint to Chris Illingworth's gloriously grand pianism, even though you can sometimes foretell what note Illingworth is going to play next because he plays so many that are the same! The complexity of the sound is jaw-



**There are three input modes: unbalanced (22-kohm impedance), balanced (22-kohm + 22-kohm), and minimal path (660-ohm).**

dropping, and the scattergun drumming of Rob Turner (who's since been replaced by Jon Scott) is epic and beautifully delivered by the Halcro.

On *Bardo*, the following track, you'll hear Blacka's double-bass sounding like nothing you've ever heard before, as he delivers miraculous high-frequency overtones that make a mockery of the instrument's normally accepted frequency range. The Eclipse Stereo delivers the entire gamut perfectly — the delivery is sonically contiguous, despite the rarity of the nature of the sound. When the drum kit comes in, at about 1:30, the accuracy with which the amplifier delivers the kick drum sound in exact syncopation with the high-hat strikes, all while keeping each in its own sonic envelope, and with no unwanted overhang, is an object lesson in the importance of state-of-the-art amplification in an audio reproduction chain. The Halcro Eclipse also maintained the 'airiness' of the acoustic as a constant throughout — a subtlety that eludes lesser amplifiers.

**... I could easily have been convinced that I was auditioning a pair of Eclipse Monos instead!**

The buzzy, insect-like opening to *One Hundred Moons* highlighted for me the complete lack of background noise from the Eclipse Stereo's circuitry — the amplifier makes no noise at all other than what is actually in the audio signal delivered to it. There is no low-frequency hum, no high-frequency hiss, and absolutely no modulation of the lowest-level background sounds on a track. Such sounds issue from an inky-black silence that is so silent it's almost mesmerising in and of itself. The simplicity of the percussion and piano on this track is a musical antidote to what has gone before, and the crystalline clarity of the sound I heard from the Eclipse Stereo was simply amazing, a testament to the complete lack of audible distortion.

I do need to warn you that I think GoGo Penguin has gone somewhat off-piste with their latest album, 'Everything Is Going To Be OK' — both sonically and musically — so if you want to hear what I heard, I recommend sticking with the four albums the band recorded with Blue Note, which include 'Man Made Object' and the aforementioned 'A Humdrum Star'.

**Mike Kirkham (left) is a self-professed obsessive collector and listener of music, with his CD and record collection spanning two rooms.**

If you'd rather test out the Halcro Eclipse Stereo's enormous power reserves and bass delivery with music that's not so 'out there', I recommend revisiting — or listening to for the first time! — Talking Heads' 1983 classic album 'Speaking In Tongues.' The funky bass sound is deep and tight, and Chris Frantz's drum, beautifully captured on this recording, sounds as real as can be. Obviously, you'd listen to opener *Burning Down The House* at a high volume, but you should also crank up the dial while listening to *Girlfriend Is Better* in order to hear how well the Eclipse Stereo can deliver the eclectic and varied synthesizer sounds on this track at any volume level you care to listen at. Listen, too, to how well the left and right channels are separated. Indeed channel separation is so complete that I could easily have been convinced that I was auditioning a pair of Eclipse Monos instead!

You can hear not only the channel separation but also the beautiful stereo imaging of the Eclipse Stereo on *This Must Be The Place* where the vocals are trademark Talking Heads timbre and the purity of the percussion sound is exemplary, particularly the 'found instrument'

sounds delivered by David Van Tieghem. I had lots of fun working out the various 'found instruments' he was playing.

I have often written in the pages of *Australian Hi-Fi* magazine that the piano is the best instrument with which to evaluate audio components due to its enormous pitch compass, supreme dynamics and the fact that it's a stringed percussive instrument, and you could have no better music to hear all of this than that on French pianist Alexandre Tharaud's 2009 recording of more than 70 works by Erik Satie. This, of course, includes the famous Gnossiennes, but here they are strangely interweaved with other, lesser-known works in such a way that it's as if you're hearing them for the first time.

Indeed some of these works you may actually be hearing for the first time, because it was Satie, not John Cage, who invented the 'prepared piano', and unlike many pianists, Tharaud follows Satie's instructions to the letter in Le Piège de Méduse by placing sheets of paper on the upper octave strings. I can't say I liked the result, but the Eclipse Stereo certainly reproduced it faithfully. Elsewhere on this recording, Tharaud's playful execution of Satie's more conventional scores is certainly more entertaining than the performances delivered by more sedate pianists.

## CONCLUSION

The Halcro Eclipse Stereo is not only the most recognisable amplifier in the world, along with being one of the most beautiful, but it is also the quietest and has the lowest distortion of all.

If you think that is part and parcel of what makes it one of the best-sounding amplifiers in the world, I'm not about to disagree. You may, however, be surprised to learn that the Eclipse Stereo is not one of the most expensive hi-fi amplifiers in the world. In fact, it's not even close — dozens of its competitors have price tags in excess of $150,000!

In light of this information, you should realise that the Halcro Eclipse Stereo could be considered good value even at twice its price.

***Greg Borrowman***

**CONTACT INFO**
**Brand:** Halcro
**Model:** Eclipse Stereo
**RRP:** $66,990 ('Standard' finish)
**Warranty:** Five years
**Dimensions (hwd):** 79 x 40 x 40cm
**Weight:** 85kg
**Distributor:** Magenta Audio Pty Ltd
**Address:** 9 Deviation Road
Carey Valley
South Australia 5144
**T:** (08) 8390 1673
**E:** sales@magentaaudio.com.au
**W:** www.magentaaudio.com.au; www.halcro.com

# Laboratory Test Report

Readers interested in a full technical appraisal of the performance of the Halcro Eclipse Stereo Power Amplifier should continue on and read the LABORATORY REPORT published on the following pages. Readers should note that the results mentioned in the report, tabulated in performance charts and/or displayed using graphs and/or photographs should be construed as applying only to the specific sample tested.

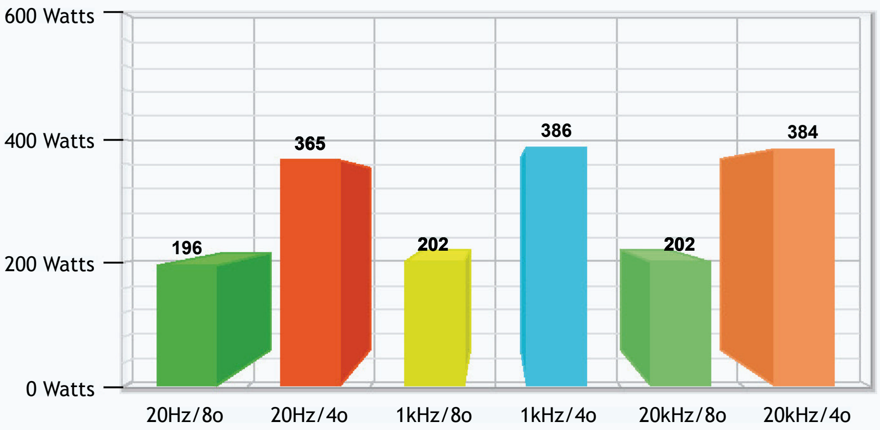
Halcro rates the per-channel power output of the Eclipse Stereo as 180 watts into eight ohms and 350 watts into four ohms. With the Eclipse Stereo on its test bench, *Newport Test Labs* measured the 1kHz power output at 202 and 386 watts per channel into eight and four ohms respectively, so the power amplifier bettered its specification for both test loads.

As you can see from the tabulated results, power output dropped to 196 watts into eight ohms when the test frequency was dropped down to 20Hz (when driving two channels), and to 365 watts when both channels were driven into four ohms at this same 20Hz frequency. While these are lower than the 1kHz power output results, they're still comfortably higher than Halcro's specification.

*Newport Test Labs* measured the frequency response of the Eclipse Stereo as being 3dB down at 3.5Hz and 280kHz, so this is a very wide-band amplifier design. It's also a superbly linear one, as evidenced by the 1dB down-points of 6.5Hz and 90kHz, meaning the normalised frequency response is 6.5Hz – 90kHz ±0.5dB.

As you would expect, the frequency response was even flatter across the audio band. This response (Graph 1) shows that it's around 0.1dB down at 20Hz and 20kHz, for a normalised response of 20Hz – 20kHz ±0.05dB. This frequency response was, as per industry standards, measured when the Eclipse Stereo was driving an eight-ohm test resistor. On this graph you would normally expect to find a second trace showing the amplifier's response when driving a more complex load, one that simulates the load that a loudspeaker would present. In fact, that trace is there — you just can't see it because it perfectly overlays the response into a resistor. This is the first time *Newport Test Labs* has ever measured this theoretically 'perfect' result!

Separation between the two stereo




Halcro Eclipse Stereo's power output with both channels driven

channels was outstandingly good, as you can see from the accompanying result table — 86dB at 20Hz, 101dB at 1kHz, and 78dB at 20kHz. Also outstandingly good was the level matching of the two channels, with *Newport Test Labs* measuring a difference of just 0.01dB. Inter-channel phase accuracy was also exceptionally good, with errors of only 0.02° at 20Hz, 0.08° at 1kHz and 1.17° at 20kHz. The result at 20kHz may seem to be an outlier, but you should bear in mind that a result of 1.0° at this frequency would be a world-beating achievement.

Measuring the level of distortion on an audio signal that is introduced by a Halcro amplifier is a near-impossible task because it is so low that it is supremely difficult to measure. You not only need a test instrument capable of making the measurement but also a signal generator that has lower distortion than both the amplifier and the test instrument. To illustrate the difficulty, look at Graph 2, which shows the distortion components inherent in the output of *Newport Test Labs*' best signal generator. You can see that there's a second harmonic distortion component at –117dB (0.00014%), a third HD component at –122dB (0.00007%) and a fifth at –128dB (0.00003%). So if we used this generator to provide the signal to measure the Eclipse Stereo's distortion and saw a result that exhibited these same distortion components, at around the same levels, we would know only that the Halcro was not adding unwanted distortion.

Indeed this is exactly what we see in Graph 3, which shows the output spectrum of the Eclipse Stereo when it's delivering this same 1kHz signal but amplified to a level of one watt into eight ohms. Essentially, the only difference is that the amplifier has added just a little distortion at 3kHz, so that it is at –120dB instead of –122dB. (The result was exactly the same when the Eclipse Stereo was driving a four-ohm load.)

The other thing to note with Graph 3 (because it will be significant later) is that there is some noise visible at the bottom of the graph, however as you can see from the scale at the left, the noise is 140dB below the one-watt reference level, which is so low that it would be totally and completely inaudible under any conditions.

Graph 4 shows distortion (and noise!) levels measured by *Newport Test Labs* when the Halcro Eclipse Stereo was delivering 1kHz into eight ohms at a power level of 20 watts. Again, you can see that the distortion 'signature' is essentially that of the test signal generator, so the Eclipse Stereo is not adding any distortion to the test signal itself. Note, too, that there is now no audio band noise visible on the graph, so the Halcro's audio band noise is now well below 140dB. There is some noise visible (the single narrow peak at the extreme left of the graph), which is from the amplifier's power supply, but it's more than 120dB down. Again, the result when the Eclipse Stereo was tested into a four-ohm load at this frequency and power output was exactly the same as it was into the eight-ohm load.

Graph 5 shows an extreme test case for distortion, which here is shown when the Eclipse Stereo is delivering 1kHz into an eight-ohm load at its full rated power (180 watts). The result is mind-bogglingly (and I mean that in its truest sense) good. As you would expect, there is absolutely zero noise in the output other than that tiny leakage from the power supply, and the distortion levels are almost unchanged from that shown in the one-watt and 20-watt graphs. The level of the third harmonic has risen slightly so that distortion component is now sitting at –117dB, which is 0.00014%. The fifth-order component has also risen by 1dB to –127dB (0.00004%).

The result of *Newport Test Labs*' testing aligns with Halcro's claims that the Eclipse Stereo's THD levels are "better than –120dB", a lever that it points out is "lower than 1000 parts per billion". The distortion result shown in the accompanying test result table tells the THD story in an easily understandable numeric form: 0.00006%.

The level of intermodulation distortion (CCIF-IMD) measured by *Newport Test Labs* is shown in Graph 6, when the Eclipse Stereo was delivering twin 19kHz and 20kHz test signals at a level of 20 watts into eight ohms. There are only two high-frequency sidebands, at 18kHz and 21kHz, that are each 110dB down and so would contribute

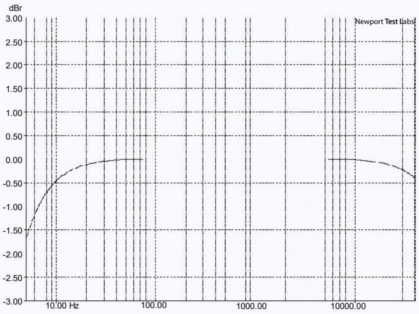
## Halcro Eclipse Stereo Amplifier – Test Results – Power Output

| Channel | Load (Ω) | 20Hz (watts) | 20Hz (dBW) | 1kHz (watts) | 1kHz (dBW) | 20kHz (watts) | 20kHz (dBW) |
|---|---|---|---|---|---|---|---|
| 1 | 8 Ω | 202 | 23.0 | 202 | 23.0 | 202 | 23.0 |
| 2 | 8 Ω | 196 | 22.9 | 202 | 23.0 | 202 | 23.0 |
| 1 | 4 Ω | 382 | 25.8 | 386 | 25.9 | 384 | 25.8 |
| 2 | 4 Ω | 365 | 25.6 | 386 | 25.9 | 384 | 25.8 |

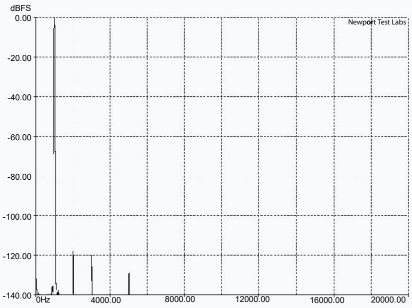
**Note:** Figures in the dBW column represent output level in decibels referred to a one-watt output.

## Halcro Eclipse Stereo Amplifier – Laboratory Test Results

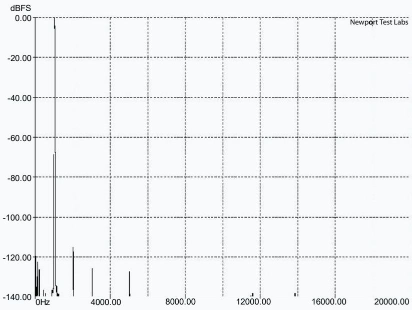
| Test | Measured Result | Units/Comment |
|---|---|---|
| Frequency Response @ 1 watt o/p | 6.5Hz – 90kHz | –1dB |
| Frequency Response @ 1 watt o/p | 3.5Hz – 280kHz | –3dB |
| Channel Separation (dB) | 86dB / 101dB / 78dB | (20Hz / 1kHz / 20kHz) |
| Channel Balance | 0.01 | dB @ 1kHz |
| Interchannel Phase | 0.02 / 0.08 / 1.17 | degrees ( 20Hz / 1kHz / 20kHz) |
| THD+N | 0.00006% | @ rated output |
| Signal-to-Noise Ratio (Unwghted/A-wghted) | 101dB / 107dB | dB referred to 1-watt output |
| Signal-to-Noise Ratio (Unwghted/A-wghted) | 124dB / 130dB | dB referred to rated output |
| Input Sensitivity (Balanced Inputs) | 191mV / 2.6V | (1-watt / rated output) |
| Output Impedance | 0.002Ω | @ 1kHz |
| Damping Factor | 4000 | @1kHz |
| Power Consumption (1) | 6.43 / 210 | watts (Standby / On) |
| Power Consumption (2) | 216 / 655 | watts at 1-watt / at rated output |
| Mains Voltage Variation during Test | 245 – 247 | Minimum – Maximum |



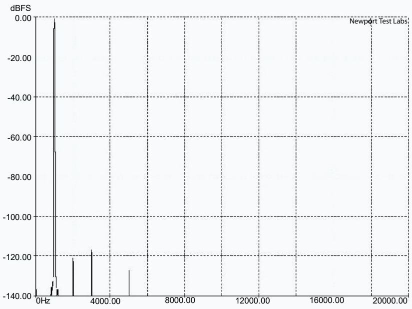

**Graph 1.** Frequency response at 1 watt into 8 ohms and into simulated loudspeaker load.



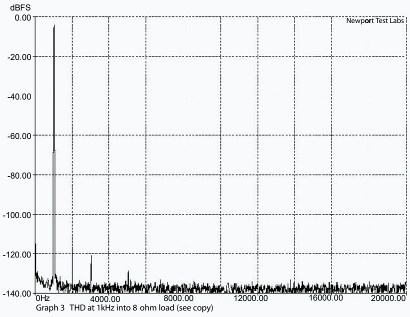

**Graph 4.** THD at 20 watts into 8 ohms with 1kHz test signal.



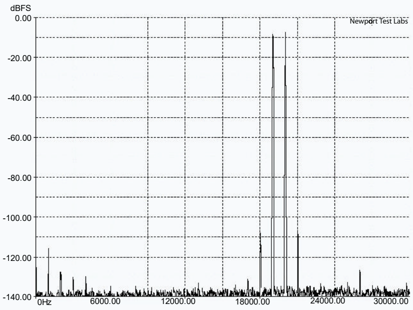

**Graph 2.** Output of low distortion test signal generator at 1kHz.



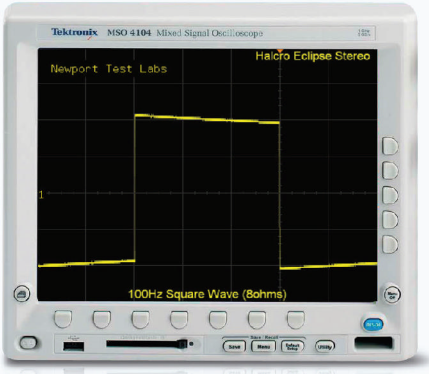

**Graph 5.** THD at 180 watts into 8 ohms with 1kHz test signal.

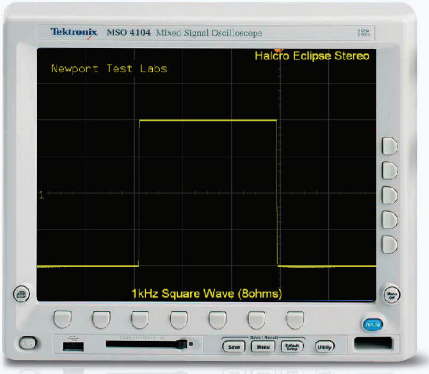


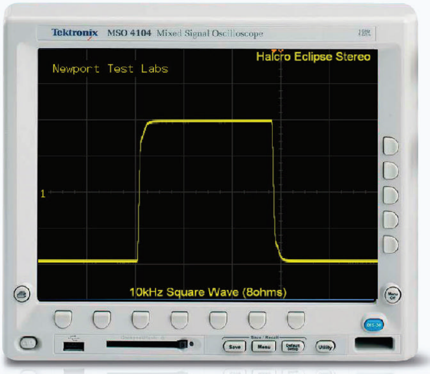

**Graph 3.** THD at 1kHz into 8-ohm load.

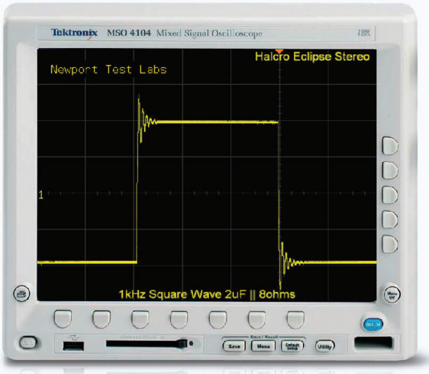



**Graph 5.** IMD at 20 watts into 8-ohms with 19kHz & 20kHz test signals 1:1 ratio.




0.0003% to the output — insignificantly small. There is a tiny regenerated signal down at 1kHz too, but it is also insignificantly small — 117dB down, contributing only 0.00014%. All other signals are more than 120dB down, which is the level specified by Halcro for this particular test.

The overall wide-band signal-to-noise ratios measured by *Newport Test Labs* were, as we're sure you've already guessed from the noise floors shown in the graphs, spectacularly low. Noise relative to an output level of one watt was measured at –101dB unweighted, and –107dB A-weighted. We can't think of a single amplifier the lab has measured that has ever come within cooee of returning a noise figure better than 100dB when referenced to this power level. The noise figures were better again for the measurement at rated output, with the Halcro returning results of –124dB unweighted, and –130dB A-weighted.

As one who is 'experienced in the art' would expect from Graph 1, the output impedance of the Eclipse Stereo was incredibly low, with *Newport Test Labs* measuring it as 0.002 ohms at 1kHz, which is an order of magnitude better than almost all other amplifiers and means a damping factor of 4,000!

Square wave testing reflected the results returned when measuring the Eclipse Stereo's frequency response, with the tilt on the 100Hz square wave reflecting the –3dB point of 3.5Hz (Halcro specs it at 3Hz). There's no bending so there's no low-frequency phase shift. The waveform at 1kHz is so squared-off and clean that it may as well have been issued directly from the lab's function generator, and is therefore a perfect result.

At a 10kHz test frequency there is some rounding evident on the leading edge of the waveform, reflecting the high-frequency 3dB down-point of 280kHz, but the overall rise time shows a very, very fast slew rate.

The Eclipse Stereo's ability to drive extremely demanding loudspeakers, as well as electrostatic designs, is shown by its performance when delivering a 1kHz square wave into an eight-ohm resistor paralleled with a 2μF capacitor. That performance was outstandingly good, with the initial overshoot being less than one-quarter wave height, and the small amount of resultant ringing being damped within five cycles. This amplifier will be completely stable into any loudspeaker.

We rather hope that this test report gives the average non-technical reader an appreciation of just how well this amplifier performed on *Newport Test Labs'* test bench, but we suspect that ultimately it will be only those readers with a degree in electrical engineering who will truly appreciate the outstandingly high levels of performance delivered by Halcro's Eclipse Stereo. It is a truly mind-bogglingly good amplifier!

**Steve Holding**

# Len Wallis: "Hi-fi is an industry built on passion"

This time in our 'Sound Travels' series, *Australian Hi-Fi* magazine contributor **Tom Waters** visits one of the stalwarts of Sydney's hi-fi scene, Len Wallis — the man behind the eponymous audio store in the Lower North Shore suburb of Lane Cove — about the many changes the audio market has seen over the years. For many decades, Wallis has consistently delivered the best of the best to the city's audio community, and thankfully plans to continue doing so for years to come...

***Tell us a bit about how Len Wallis Audio started back in the late '70s...***

At that time I was working for Allied HiFi in Crows Nest. Unfortunately, things were not going well for the shop, and being worried about losing my job I suggested to my wife Suzie that we open a business of our own. This was a huge leap of faith on her behalf — we were about to start building on a block we owned in Dural, which we had to sell to finance the business. It was a bit of a risky move back then and, since both of us are country folk, it was also a brave move that solidly bound us to the city. But it has worked out well.

***The market has changed dramatically since you opened shop in 1978...***

The market was so much simpler then. The total sum of our hardware consisted of turntables, amplifiers, tuners, cassette decks, speakers and cabinets. There was no box-mover competition; our closest mass-market competition was Waltons [for the uninitiated, Waltons was a sort of downmarket Harvey Norman, now long gone]. There was, however, a hi-fi shop on every corner.

When we first opened, we had a little cash shortfall and consequently I couldn't get all of the stock we wanted... so we got some plants to help fill things out. On the opening day, I recall standing in the doorway looking back into the store to see how it looked, when I realised someone was standing next to me (I still remember he was wearing an NRMA uniform). He did not come in, he simply commented: "Another hi-fi shop — Autel Systems will eat you alive."

With that he walked away. A very disturbing start! For those who don't remember, Autel Systems was one of the big, well-established retailers back then, along with Kent HiFi and Douglas HiFi.

CD players were introduced five years after we opened, which was the first major innovation in many years. And when in 1986 Yamaha released their DSP-1, an add-on surround processor, all hell broke loose. Suddenly we were no longer simply a hi-fi store: we were dabbling in video as well, and eventually added TV to our line-up.

By the late '80s, interest was growing in multi-room audio and dedicated home theatres. CEDIA was born in the US in 1989 and Len Wallis Audio was a founding member of the Australian chapter in the early '90s. Now we were grappling with hi-fi, video *and* multi-room audio.

Our custom installation business grew out of CEDIA and is now a dedicated division of our company that currently represents about half of

our business. That means working in automation, networking, lighting control and so forth.

***What got you personally interested in hi-fi? What made up your first system?***

As a kid my main interest was music, and hi-fi became more important later in life. I spent six years in boarding school and was rarely without a transistor radio (which were banned!). When I left school, I had a very inexpensive all-in-one system, which was then stolen. I saved some money and called around a few dealers for advice. A sales girl at a store called MS Sound in St Peters said she had just the thing I needed and sold me a JVC Nivico stereo receiver, which cost every penny I had saved! I actually still have the same receiver on static display in the store — and it still works! In those days, my speakers were old Kenwood speakers with timber frets on them. My turntable was by Yamaha — not great but it did the trick. And the first album I bought was the Bee Gees 'Greatest' (hits) which you can still buy today!

The bug had truly bitten, and I eventually went to work for MS Sound in 1970.

***I'm guessing you've seen the move from analogue players to digital and now back to analogue. What attracts the most customer interest these days?***

This is a real roller coaster ride. The whole digital recorded media phase (CD, DAT, DCC and so on) has come and gone, but we are now amid the latest variant — streaming. At the same time, we are seeing the resurgence of vinyl, but there is more than one market in play here. Audiophiles

have rediscovered vinyl for all the right reasons, and we are seeing a small but growing number of younger people embracing the *sonic aspects* of vinyl too.

On the other hand, we are witnessing a groundswell of younger people who are attracted to vinyl, and we are increasingly being asked for turntables that allow for Bluetooth streaming to their Bluetooth speaker (and similar requests). *Why?* This simply takes all the downsides of vinyl (inconvenience, for one) and imposes it on a technology unable to recognise the upsides. That said, it is at the same time introducing a technology to this new and fertile market that can — and hopefully will — lead to bigger and better things.

When we were kids, we listened to the 'Top 40', over and over. Apart from what you might buy yourself, that's all that was available. Nowadays, kids have access to virtually all the music that's ever been made. It's discouraging to see them listening via earbuds or plugging into inexpensive wireless speakers.

These kids have everything at their feet, we just have to educate them; it has to be a store such as ours. One of our good customers recently brought in his two young daughters to listen to some classical. It wasn't their music of choice, but he told me that they can't stop talking about it. Young kids need that exposure to learn and appreciate what is possible. We can't expect The Good Guys or Harvey Norman to play music that bring tears to their eyes.

So, as difficult as it can be at times, we don't discourage their choices — it could just be the foot in the door they, and we, need.

***The pandemic would've dented your shop's footfall. No doubt your website helped out here, but did you have to make many changes?***

We didn't fare as well as many other stores and that is a result of our philosophy. We believe that true hi-fi should not be sold on price alone but on performance, and that decision cannot be made without listening. After more than 50 years of spending every working hour in this industry, the only way I can judge a product is by listening to it. Reviews, forums, peer recommendations, can be invaluable guides, but it still comes down to your own ear. COVID took that away from us for some time — but we survived.

> We need to demonstrate the emotion our industry is capable of — we're taking the easy way out

So yes, the website did bring in sales. But I believe online sales are price-driven: people shop around to find the best price, which is understandable. To me, shopping when this is the sole criteria is very impersonal, but I admit it's going well for many businesses. The online shopper isn't building any relationship with the business, so when you need advice or a product needs servicing, you have no recourse. As I said, I feel people have to listen first, which was very difficult during the pandemic.

Recently, I put together a system for a customer in central NSW. He couldn't come to the shop, but I knew his preferences so put a system together and sent it to him. He loves it and he says it gets better every day. But those situations are exceptions.

Whilst our shop doors were closed for months, thankfully our custom install business remained operational to some extent. So long as we abided by the rules and regulations, we could keep running that business, which helped our bottom line immensely. Unfortunately, some of our installers were in locked-down areas, which also affected us.

Some businesses switched to predominantly online sales during COVID, but we didn't change our business model; we carried on doing what we've always done.

***Do you try to build relationships with people through social media?***

We have tried that but it isn't something we're strong on. We've talked to various people to get ideas on how it might help but so far haven't found an approach we like. You're only going to get some people who want what you have, so if they don't know what you have, they don't know they want it! And those who don't understand the audio industry may not even know what they want. Perhaps social media could help a bit here. Ultimately, it's difficult to discuss [hi-fi] when we aren't face to face, though we do see it as a means to 'break the ice' so that people will be less intimidated when they finally enter the shop.

***There are many opinions about how to attract the young to hi-fi. It's difficult since there are so many other tech attractions, like gaming. Do you know how to get more through the door?***

We are all struggling with this. The crazy thing is that we have an unbelievably fertile market — a couple of generations of cashed-up people who have all the music they could want at their fingertips. Unfortunately, they have never been exposed to the [playback] possibilities. That is our challenge, and I don't have the answer, which is unfortunate because on more than one occasion a younger person has been reduced to tears upon hearing what they had been missing out on

(sadly, they aren't reading this publication).

So, how do you attract young people that aren't even looking for you? Years ago, we used to advertise in newspapers, which were always lying around in stores and coffee shops. You might take the part you were interested in and leave the rest for someone else. That brought in a lot of business. What's the modern-day equivalent? Maybe we should be advertising in the *Financial Review* (well, maybe not for the kids!) or gaming, car and travel magazines. It may get us in front of young people who don't realise we could actually help them.

***Sticking with the future, how do you think hi-fi will change over the next five to ten years?***

I'm not convinced the current growth in vinyl uptake will continue; I think it will plateau. Streaming will continue to grow and more people will embrace higher-resolution platforms (and music services will respond accordingly). I think this will bring a younger generation into the market — they generally understand and respond to numbers, and curiosity will get the better of them! Even the notion of hi-res may appeal; they will think it's something they should have.

> ... a younger person has been reduced to tears upon hearing what they had been missing out on

I think we will also see a trend towards some of the small all-in-one systems such as the Naim Uniti series: high-quality, single-box solutions. And likely their integration with the TV, not necessarily in a surround sound setup. So, your streaming, records and TV will all play through one central box. Sales of such solutions will help high-end brands finance their high-end products.

Years ago, we sold systems first and then eventually people came back for headphones. Nowadays, more and more people are building their main system around headphones. They might then later add a different source and a DAC. It's gone backward! I can see this continuing, especially for younger customers with limited funds and/or little space.

I've noticed an interesting trend of late, too: more women are buying hi-fi on their own. They appear to be in the 35-50 age bracket. They make excellent clients; they know what they like and aren't driven by the macho look where everything has to be big and loud. And I think they have better ears! If only they'd bring their kids!

***What are the greatest challenges for the high-end market?***

We are losing our soul. Hi-fi is becoming a marketing exercise. While there have always been brands with larger marketing budgets than performance capabilities, we are seeing a more widespread mainstream diminished of passion. I find that to be the case with not only retailers but suppliers and brands as well.

Some of the chief founders and designers of the original high-end manufacturers from the '70s have passed their companies on to faceless corporations. These were passion-driven people. We need to demonstrate the emotion our industry is capable of — we are taking the easy way out. Hi-fi is an industry built on passion, and you cannot convey that via a keyboard. Of course, some of this has been driven by economics — they need a return for their shareholders. But they must remember that a sale is never made until there is a transfer of enthusiasm. A consumer can sense whether that passion, that enthusiasm, is there. Perhaps that brings us back to why people shop online — if there is no passion or enthusiasm in the in-store experience, then why not?

A little story for you: years ago I did a study on high-end watches. I called Rolex and asked how much a Blue Oyster would cost and how long it would take to receive. The sales fellow said, "Sir, we don't sell watches, we take expressions of interest". Here is a business that isn't pushing sales at all, yet sells everything it can make. And how is a Rolex watch different from a Swatch? They both tell time. It's incredible marketing at work here! But Rolex has prestige attached to it. Perhaps it comes down to status: you can show your Rolex to the world because it's visible on your wrist. Conversely, a high-end hi-fi system is locked away in your home out of sight from most people, so there is considerably less visible status attached to it.

***Outside of hi-fi, what do you do for fun?***

Interesting question. Where do work and fun separate? Right now, I am listening to Muddy Waters. Music plays a large role in my private life, be it live or recorded. We love to travel, we love sports and movies, and we're keen walkers (although my hips suggest this is not such a great idea anymore).

australian hi-fi MARKET PLACE

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| | The Hi-Fi Shop | The Chain Store | The Internet |
|---|---|---|---|
| 1 | Talk to people with years or decades of hi-fi knowledge | Talk to people with days or even weeks of hi-fi knowledge | No people |
| 2 | Receive reliable personal advice | Bit of a lottery on the advice front | No advice |
| 3 | Expect to be asked about your needs and music | Expect to be asked about your budget | No filtering questions |
| 4 | Listen in a room environment before you buy | Listen over a noisy shop floor if you can listen at all | No listening |
| 5 | Have a nice coffee | There's a coffee shop three doors down in the Mall, mate | Make your own |
| 6 | Purchase with pride | Purchase in ignorance | Purchase with fear |
| 7 | Get a full warranty with local return point | Be offered an extended warranty you probably don't need | Warranty possibly void in Australia |
| 8 | After-sales service | After-sales what? | After-sales what? |
| 9 | Have an ongoing relationship | Rarely the same staff twice | No contact with staff |
| 10 | Relax and enjoy fine music | Relax and enjoy your mass-market bargain | Purchase and pray |

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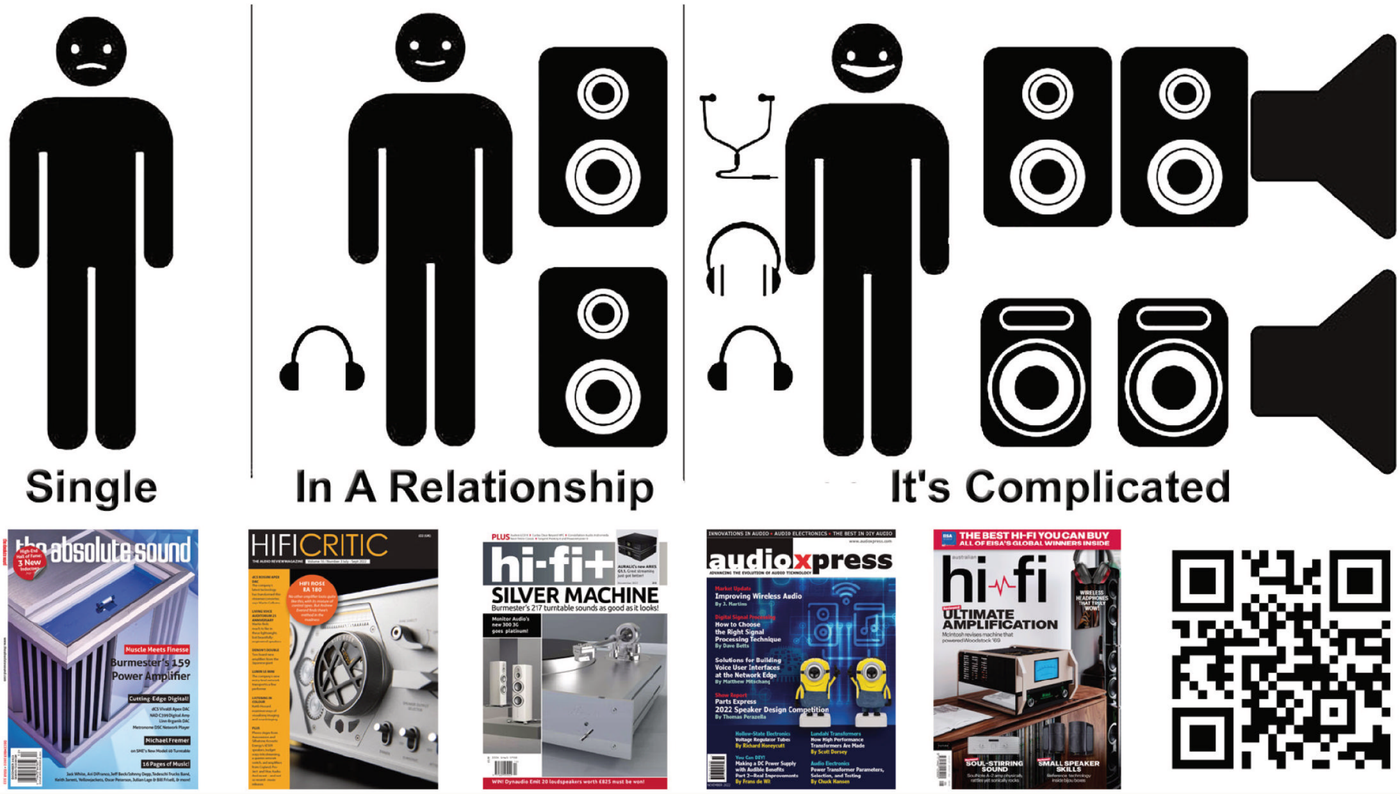


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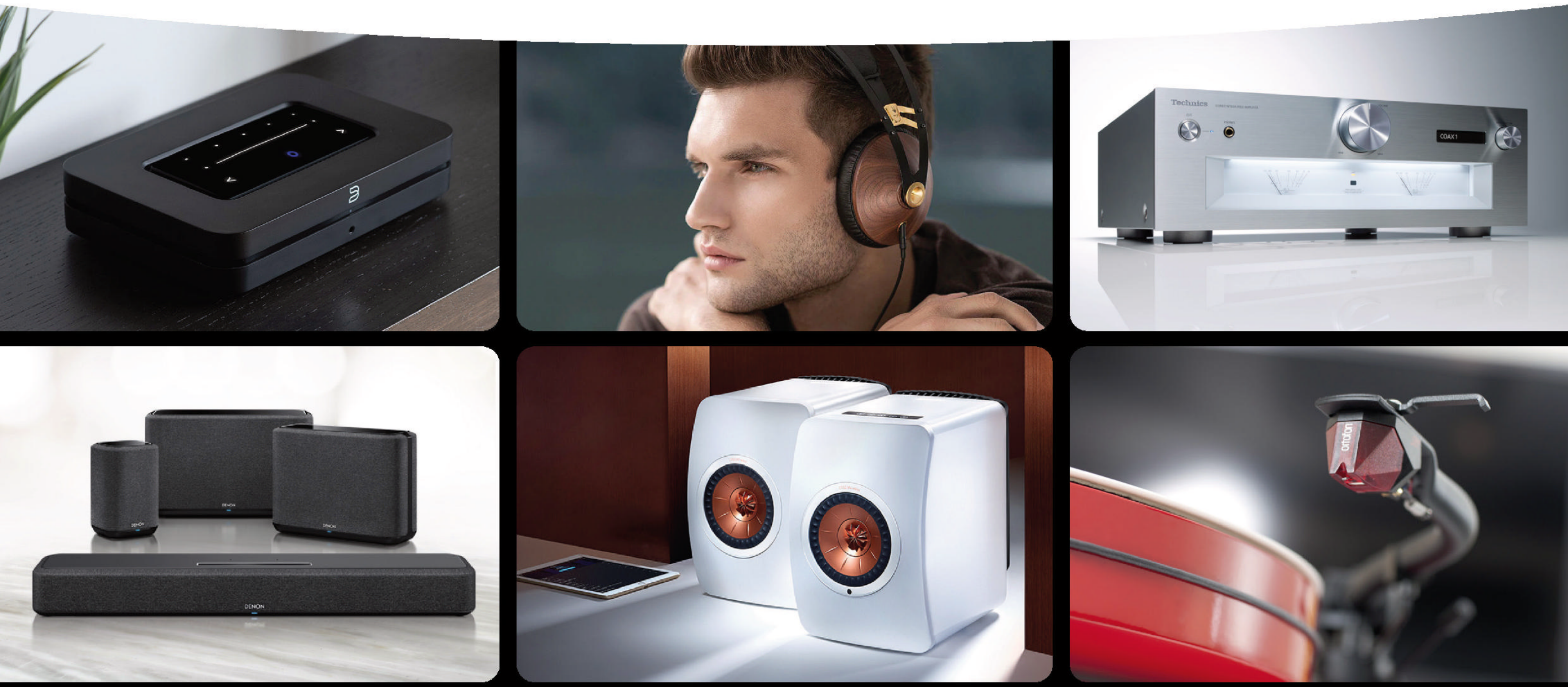

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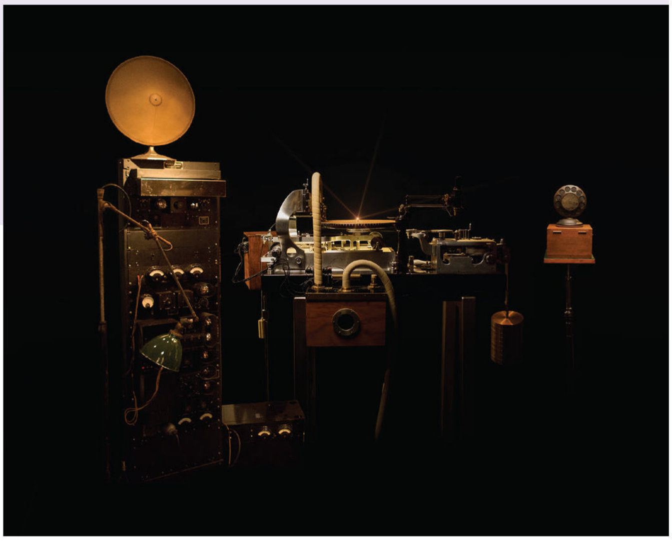
# 5 vinyl & music docos to watch for free (or very little)



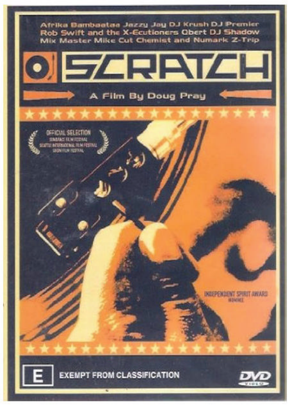
## The American Epic Sessions (2017)

**108 minutes, YouTube**

In 2017, Jack White and other musicians including Elton John, Nas, Willie Nelson and Beck took part in a documentary called 'The American Epic Sessions', in which they replicated the recording process with the very first (and long-thought-lost) electrical sound system from 1925. This comprised one microphone, a six-foot amplifier rack, and a live record-cutting lathe powered by clockwork gears that used pulleys and a weight to drive them; it would take three minutes for the weight to hit the floor and the recording was finished — which no doubt explains pop songs' traditional runtime of three minutes or under. Its one-take, time-limited nature meant that musicians and engineers of the time referred to the process as 'catching lightning in a bottle'. It's fascinating to watch, and hear, the results of White and Co's recording.

## Scratch (2001)

**85 minutes, YouTube**




Before going on to write and produce the HBO docuseries 'The Defiant Ones' (which chronicles the legendary careers of Dr. Dre and Jimmy Iovine), American filmmaker Doug Pray made a feature-length documentary on the story of the hip-hop DJ, from the birth of the genre when pioneering DJs began extending breaks on records, to the invention of scratching and "beat-juggling" vinyl in the '70s, to the more recent 'turntablism' movement in which the DJ manipulates the record player as if it's an instrument. In 'Scratch', we hear from both underdogs and virtuosos who have changed the way we create and hear music.

## Stuck in the Groove (2021)

**90 minutes, Tubi TV**

One of the great things about the vinyl revival pushing on is that we're still getting a slew of relevant content around it. In 2021, DJ-turned-music-and-film-producer Taylor Golonka released his missive on vinyl mania and the evolution of records, taking the viewer on a 90-minute, nostalgia-soaked spin predominantly through interviews with collectors, record store owners and mastering and manufacturer experts on their love of vinyl, the perpetual longing for vintage sound and the record-related stories that have shaped them. It finds a nice balance — lightheartedly brass tracks at times, educationally technical at others.

## Vinyl (2000)

**110 minutes, YouTube**

For the fans by a fan, 'Vinyl' sees Toronto filmmaker and avid record collector Alan Zweig explore not vinyl albums themselves but rather what inspires people to start collecting them in the first place — and the emotional attachment, and in some cases obsession and excessiveness, the hobby can provoke. His own and others' confessions really open a wide window into the psyche behind record collecting.

## Vinylmania: When Life Runs at 33 Revolutions Per Minute (2012)

**76 minutes, Vimeo (rent)**

A sincere love letter to the "object that has never lost its soul", this comprehensive doco explores the history, cultural impact and comeback of, and the fascination with, the vinyl record, including commentary from Philippe Cohen Solal (Gotan Project), Winston Smith (Dead Kennedys, Green Day record sleeve artist), Peter Saville (Factory, Joy Division, New Order record sleeve artist) and DJ Kentaro (2002 DMC World DJ Champion).

## Kings Of Leon

### Can We Please Have Fun

LOVETAP/CAPITOL

Fun, you say? In these times of war, famine and economic strife, Nashville's space-country glowerers Kings Of Leon have emerged from the weighty musings of 2021's 'When You See Yourself' — wildfires, marital fracture, addiction, anxious youth — cautiously coated in silver lining for their ninth album.

'There's a war outside, we should all get high,' Caleb Followill recommends as the cosmic funk groove of *Nowhere to Run* kicks in. Later, images of 'panic on the streets' are couched in the vital and excitable tones of early noughties riot-rock on *Nothing to Do*. It's misleading to suggest that Followill is in an ebullient and optimistic mood here; these are songs of confusion, bewilderment and anxiety. But as abstract hints of falling bombs, civil unrest and ecological collapse are peppered around songs titled *Ballerina Radio* and *Rainbow Ball*, alongside moments of youthful nostalgia and romantic security, there's a distinct sense that life, love and occasional lark must go on amid the chaos.

KOL certainly seem as though they're having fun with their recent future-rock incarnation. Since Markus Dravs updated their sound on 2016's 'Walls', they've developed textural kinships to Tame Impala, The National and Death Cab for Cutie. Now, with Harry Styles producer Kid Harpoon adding a confident mainstream glint, they settle into such sonics, unshowy and under no pressure to over-press their modernity. It's an approach that allows the amorphous, motorik and Foals-y tones of *Ballerina Radio* and *Rainbow Ball* (and later the euphoric sludge rock of *Seen*) to service subtly crafted pop melodies that, while not the band's most direct, are certainly among their most infectious growers. And it lets the album's real canyon bawlers – *Mustang*, *Nothing To Do*, *M Television*, the gloriously strident *Hesitation Generation* – leap from the mix.

There's also plenty of playfulness on display. *Actual Daydream* alternates between surf flamenco Costello verses, and choruses akin to a mariachi Fleetwood Mac. Alt-country ballad *Don't Stop The Bleeding* drifts along sweetly on crackling antique beats. The beautiful *Split Screen* revisits an emotional late-night video call, awash with suitably hypnagogic atmospherics. Bossa nova ballad *Ease Me On* sips its pina colada in an inflatable pineapple ring floating not too far from Mac DeMarco. It's no surprise party — and less giant leap than consolidatory glide — but 'Can We Please Have Fun' has its fair share of high times.

## Desperate Measures

### Sublime Destruction

CADIZ

The early '80s New Zealand punk band have been reanimated in early 2020s South London. Once invited to kiss the papal punk ring of Joe Strummer himself when they played at a Clash gig aftershow in their homeland, Desperate Measures have been resurrected 40-odd years later by sole remaining original member Eugene Butcher, with a new line-up of unlikely London lads bolted on. They may look like a crew of binmen, but DM are genre aficionados: they know the punk-rock story inside out and back to front. That means you get some impressive Stooges-influenced craftmanship (the resolute garage groove of *Enjoy The Ride* and the intimidating dark menace of *Seven Sisters*), Psychedelic Furs with a hint of Leatherface (the melodic harmonies of *Thinking of England*), and the Phantasmagoria extravagance of *Flowers At Your Door* — all with level of skilled musicianship far exceeding the formulaic Fisher-Price punk of your average contemporary outfits, not least guitarist Michael Gaffney's accomplished grasp of tone.

## The Black Keys

### Ohio Players

NONESUCH

Two decades after Dan Auerbach and Patrick Carney stripped the blues-band format back to the bone, the Ohio duo's twelfth album is their most sociable yet, with a guest list that includes Beck, Noel Gallagher, a brace of Memphis rappers and more besides. If you haven't yet heard the album's lead single, *Beautiful People (Stay High)*, rectify that. It's a tearaway slice of white-boy soul so immediate that you'll join the cast-of-thousands vocal by the second chorus. The rest of 'Ohio Players' is almost as good, with the greasy bass line of opener *This Is Nowhere* setting up a record that is strikingly funky. *On The Game* (the best of Gallagher's three contributions) is a classy honey-crunch jangler, the snake-hipped *Please Me (Till I'm Satisfied)* is anointed by the same voodoo priest as the Stones' *Sympathy For The Devil*, while *Don't Let Me Go* splices Nick Cave's *Red Right Hand* with the Four Tops' Motown classic *Reach Out I'll Be There*. Armed with tunes this catchy, The Black Keys will be the biggest band in the world all over again if they aren't careful.

## Mark Knopfler

### One Deep River

BRITISH GROVE/EMI

The Straits mainman has just delivered one of his best solo records. To paraphrase English critic Kenneth Tynan on legendary playwright Eugène Ionesco, once you've heard all of Mark Knopfler's solo albums, you've heard one of them. There are one or two reflective world-weary ballads, a couple of reflective world-weary toe tappers, and some finely wrought, reflective, world-weary character studies that are self-contained short stories. But the thing about Knopfler's solo albums — of which 'One Deep River' is the tenth, if you don't count soundtracks — is that it doesn't matter that they're all cut from the same cloth because it's a brilliant cloth — part Dylan, part folk, part stadium melancholy.

As it turns out, Knopfler's latest is also one of his best. All twelve songs are gorgeous, sung in a voice that sounds like it's lived a life that's full, and the character songs — which Knopfler has excelled at since *Sultans Of Swing* — are as poignant as ever. This is a mellow, melodic Americana work that will surely delight loyal fans. Roll on album number eleven.

## Marcus King

### Mood Swings

SNAKEFARM

While 2022's 'Young Blood' put Marcus King in the fast lane, it's sobering to learn that the South Carolina guitarist spent the associated tour debating the best way to kill himself.

Rick Rubin-produced third album 'Mood Swings' is a lifeline, then, with King warning of the emotional depths he'll plumb with song titles such as *Fuck My Life Up* and *Bipolar Love*. The title track is a bleak welcome, with a crackly acetate voice intoning 'hopelessness and terror' over processed drums. But a Curtis Mayfield-style guitar line arrives to rescue the song, setting the tone for a record that is more in thrall to soul than to blues, and that promotes King's keening vocal above his guitar playing (*Delilah* has one of the few extended solos).

At times, like on *Hero*, King's healing process leads him into R&B slushies that make you miss the crunch of old cuts like *Hard Working Man*. But this record is real, raw and often beautiful, as on the happy/sad acoustic trill of *Soul It Screams* and the aforementioned *Delilah*, which is as good as piano-banging torch songs get.

## Deep Purple
### Machine Head: Super Deluxe Edition
UMC

Yep, the one with *Smoke On The Water*. That song, and this album, broke Deep Purple in America and made them legends all over the globe to this day.

This is essentially a three-CD version. The first disc pairs the 2024 Dweezil Zappa remix with the same-year remaster; the second contains 'In Concert '72'; and the third delivers the previously unreleased 'Montreux '71'. Given that you already own at least one copy of 'Machine Head' and possibly bought the 1972 gig on CD in 2012, you'll need to know that this box also contains: a 60-page booklet, Dweezil's remix on vinyl in a gatefold sleeve, and a Blu-ray disc containing a Dolby Atmos version, the 1974 quadrophonic mix and some Dolby 5.1 surround variants.

'In Concert '72' is a DJ-interrupted but otherwise superb BBC radio show recorded on the eve of the 'Machine Head' release, three months after the Rolling Stones Mobile Studio trundled away from the Grand Hotel. Its value here is to underline how quickly Purple's studio work evolved once performed live.

'Montreux '71' was recorded at the lakeside resort's casino eight months before the Frank Zappa gig was ended by the fire that inspired *Smoke On The Water*. It's worth hearing for Jon Lord's keyboards alone, but out of sync as the gig was taped before sessions for 'Machine Head' predecessor 'Fireball' were complete.

Ritchie Blackmore slams 'Fireball' as the result of being "worked to death by the management" and credits the time afforded to the Swiss sessions with making 'Machine Head' "my favourite LP with Purple".

So Dweezil, you had most of 2023… whaddya got? Delicious detail, mostly, using separation technology simply unimaginable to engineer/ mixer Martin Birch in 1972. Over running times closer to the 2012 remasters than to Glover's slightly longer 1997 remix, the bass and Ian Paice's drums take another step forward. Guitar solos sound bigger, too — the one in non-album ballad *When a Blind Man Cries* now as stunning as Gillan's vocal (probably superficial differences but collectively reinforcing Glover's insistence that Purple succeeded because of "a mix of the musicianship of Ritchie, Jon and Ian Paice, and the sort of naive, homemade, simple quality of the songwriting that Ian Gillan and I brought to the band"). That mix was never stronger than on 'Machine Head', and never clearer than it is now.

## Bruce Springsteen
### Best Of
SONY MUSIC

According to *Wikipedia*, 20 studio albums, 77 singles, eight EPs, 23 live albums, seven box sets, eight compilation albums… the first artist to have a US Top 5 album in six consecutive decades. So Bruce fans are hardly going to be disappointed with a new collection titled 'Best Of', are they? You know exactly what you're getting. All that's left to argue over is the inclusions or omissions. Naturally, *Born To Run*, the Right-baiting *Born in the U.S.A.*, the chest-baring *Thunder Road* and the unstoppable groove of *Hungry Heart* are present. So too are a couple of mandatory newer tracks: *Hello Sunshine* (from 2019's Western Stars) and the epic *Letter To You* (2020). Nothing wrong with that; Bruce needs to feel he can stay fresh and relevant among all the tumultuous singalongs and anthemic posing. So, 18 tracks on a two-LP/single-CD set, and 31 on the digital deluxe set: pure Boss adrenaline from beginning to end. And if a couple of the final tracks grate a bit (*Girls In Their Summer Clothes* – really?), so what? There's more than enough magic here to keep the blood pumping.

## Brian Eno
### Eno: Original Motion Picture Soundtrack
UMC

Squeezing Brian Eno's half-century-plus career as composer, collaborator and sonic explorer into a single compilation was never going to be easy. Billed as the soundtrack to Gary Hustwit's experimental documentary portrait 'Eno', which remixes itself with each viewing, this anthology is more a selective overview than a definitive 'hits' collection. That said, it covers an admirably broad range. Inevitably, there are major omissions here: nothing from Eno's immortal Roxy, Bowie, Talking Heads or U2 collaborations, for example, although David Byrne features on the twitchy ethno-funk *Regiment* from the duo's landmark 1981 avant-world album 'My Life In The Bush Of Ghosts', and again on 2008's radiant *Everything That Happens*. Three previously unreleased tracks are all excellent, especially the sonorous, heart-tugging ballad *All I Remember* and the brassy, wonk-jazz *Lighthouse #429*. A softly tumbling *By This River*, performed live at the Acropolis with Eno's brother Roger on piano, is a luminous finale. Rightly resisting the urge to highlight one era, this is a rich, forward-thinking collection.

## These Immortal Souls
### Reissues
MUTE

Fronted by Roland S Howard, formerly of The Birthday Party and Crime & The City Solution, the Australian (initially London-based) post-punk outfit also included Howard's brother Harry on bass, ex-Swell Mapper Epic Soundtracks (a.k.a. Kevin Godfrey) on drums and Genevieve McGuckin on keyboards. Their 1987 debut, 'Get Lost (Don't Lie)', with its sense of moral squalor borne out of the reality of their precarious lives, feels today like a capsule of a vanished monochromatic era — of leather, heroin, sticky floors at venues, the Berlin Wall — with Howard's deathly yet impassioned vocals recalling something of Swans on the likes of *Marry Me (Lie! Lie!)* and *I Ate The Knife*. 'I'm Never Gonna Die Again' was released in 1992. The cultural scenery had shifted significantly, the band rather less so. Fatally, they had lost momentum — this would be their last album. Still, they hold up, with McGuckin's keyboards like chandeliers swinging from ceilings close to collapse, and Howard's caustic guitars splashing like buckets of cold water to disinfect the vomit stains.

## Sparks
### No.1 In Heaven
LIL BEETHOVEN

The outrage when Sparks — once a smarty-pants glammy rock band, LA's answer to Roxy Music — reinvented themselves as a synth duo (when there was no such thing as a 'synth duo') seems extraordinary now. But in an era of Death To Disco, the Mael brothers appeared to be not so much swimming against the tide of authentic proper music as urinating in its hair. Nowadays, though, 'No. 1 In Heaven', produced by Giorgio Moroder, stands as a pioneering experiment and commercial success. Russell Mael's soaring vocals and Ron Mael's sharp lyrics and appearance combined to create something new and bizarrely brilliant: a machine-age symphony that owed as much to Noel Coward as it did to Donna Summer. Kraftwerk themselves never bettered Sparks' vision of a robotised world: from its *Beat The Clock* to *Tryouts For The Human Race*, the album prefigured the digital age while making the lack of individuality sound fun and danceable. The next decade would see everyone from Yazoo to Soft Cell and Eurythmics to Erasure embrace electronics, but Sparks were the first to make this new pop.

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